

# **DataWorx PLC**

## **User Manual**

### **PC-DPLC-M**



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# **DataWorx PLC**

## **User Manual**

### **PC-DPLC-M**



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**PC-DPLC-M**

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Fourth Edition, Rev. B	26 February 14	Added information on ASCII data in section 5.2 Minor corrections made throughout manual

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## **1.0 Introduction**

DataWorx PLC provides an easy and inexpensive way to collect data from DirectLOGIC PLCs. The DataWorx Server stores the information onto a PC into either a comma or tab delimited text file(s). Text files may be created on a daily, monthly or yearly basis. The data may be opened in Excel, NotePad or another program of the user's choice. At this point, the user can save the files and/or print the data.

The DataWorx PLC software package is unique because it offers "report by exception" data collection rather than the typical data collection through polling of PLCs. This method allows the PLC complete control to store the data to a computer hard drive. The report-by-exception method eases network traffic because, unlike polling, the PLC sends information only when needed, rather than continuously.

### **System Requirements**

#### Hardware Required

- Pentium II with 128 megabytes of ram and 10 megabytes of hard disk space free
- An AutomationDirect PLC system using one of the following Ethernet communications modules:  
H0-ECOM(100), H2-ECOM(100), H4-ECOM(100)

#### Software Required

- The Server runs on Windows NT (SP5 or higher), 2000, XP or 7 (32 and 64 bit)
- The Monitor runs on Windows 98, NT, 2000, XP or 7 (32 and 64 bit)
- Internet Explorer 6.0 or higher

## 2.0 Installation of DataWorx PLC

Before installing DataWorx PLC:

- Ensure that the PLC(s) and Server/Monitor computer(s) are connected to the network.
- The user must be logged in as an Administrator.
- Close other Windows programs, e.g. virus software.
- Decide which installation type is appropriate:

### 1. DataWorx Server and Monitor on the Same Computer

- May be the only option if only one computer is available.
- If hosting the Server and Monitor on different computers, users may install both the Server and Monitor on the Server computer to quickly install and configure.

OR

### 2. DataWorx Server and Monitor on the Different Computers

- Ideal when the physical location of the Server computer is not easily accessible.
- Must note the IP Address or name of the Server computer.

DataWorx PLC software is available on the AutomationDirect Product Showcase CD. To install DataWorx PLC, insert the AutomationDirect CD into the PC's CD drive. The CD should start automatically and open the installation window shown below.



*Note: If the AutomationDirect CD does not start automatically, open the Windows START menu, select RUN, and type:*

*E:\setup.exe*

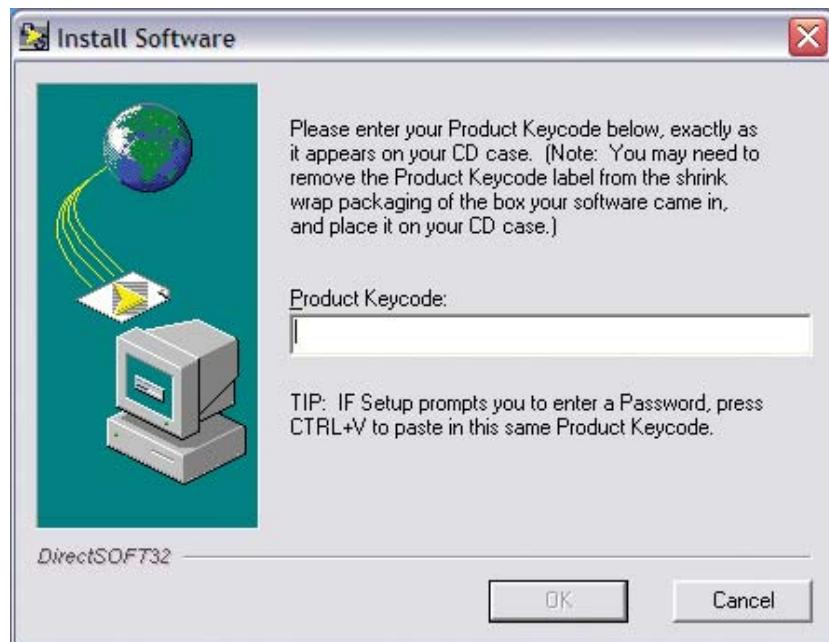
*Change the letter "E" to correspond to the CD drive. Then click OK, and the installation program will start.*

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## DataWorx PLC

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The AutomationDirect installation window will display all software options available on this CD. To install DataWorx PLC select the **INSTALL PURCHASED SOFTWARE** option. This selection opens the Product Key window shown below:



In the given field, enter the Product Key, located on the back cover of the CD case. This software package is protected by the Product Key. Only licensed users that have this key may install the software. After entering the Product Key, click **OK**.

To start the installation program, click **NEXT**.



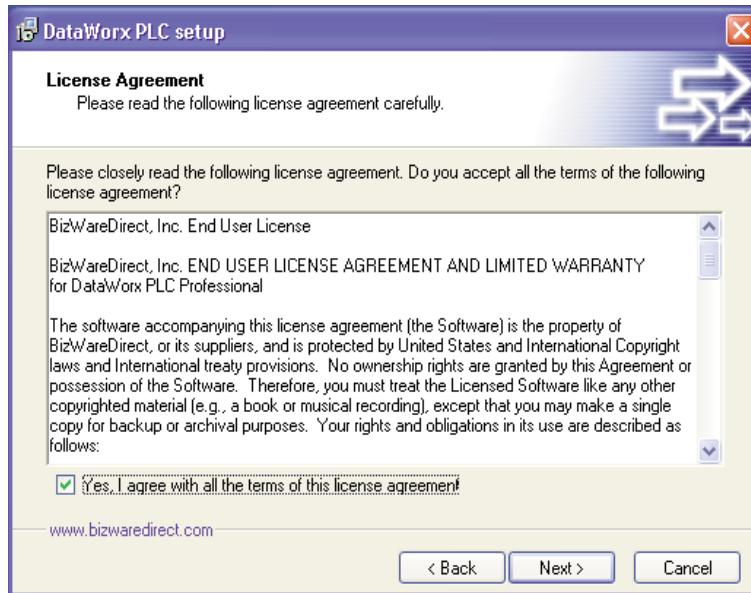
Read and make sure you understand the license agreement.



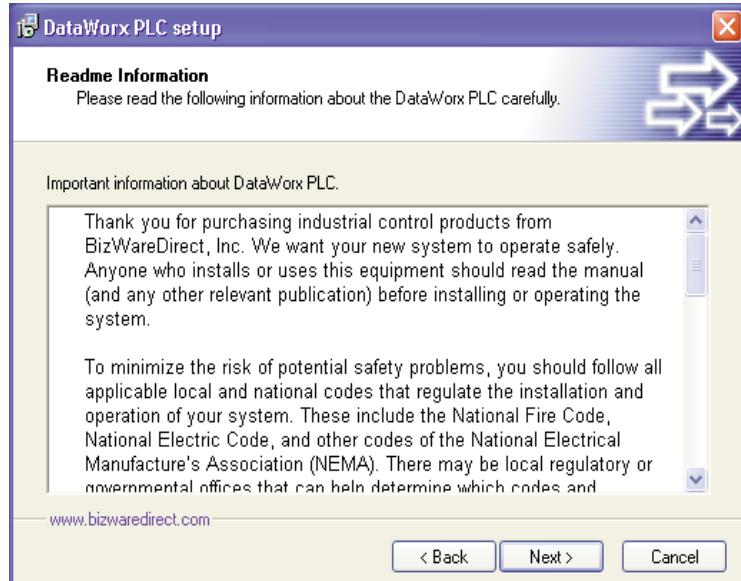
# DataWorx PLC

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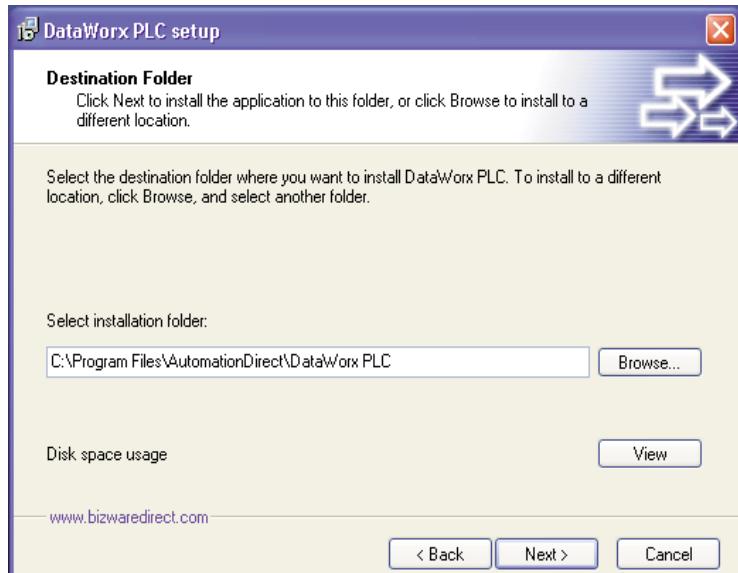
After reading and understanding the license agreement check the "Yes, I agree with the terms of this license agreement" option and click **NEXT**.



The following window contains important Readme information. After reading this information, click **NEXT**.



A prompt for the DataWorx PLC Destination Folder will appear. By default, the Destination Folder path is set to *C:\Program Files\AutomationDirect\DataWorx PLC*. The location of the DataWorx PLC files can be changed by clicking BROWSE and selecting an alternative folder.



Once the Destination Folder has been determined, click **NEXT**.

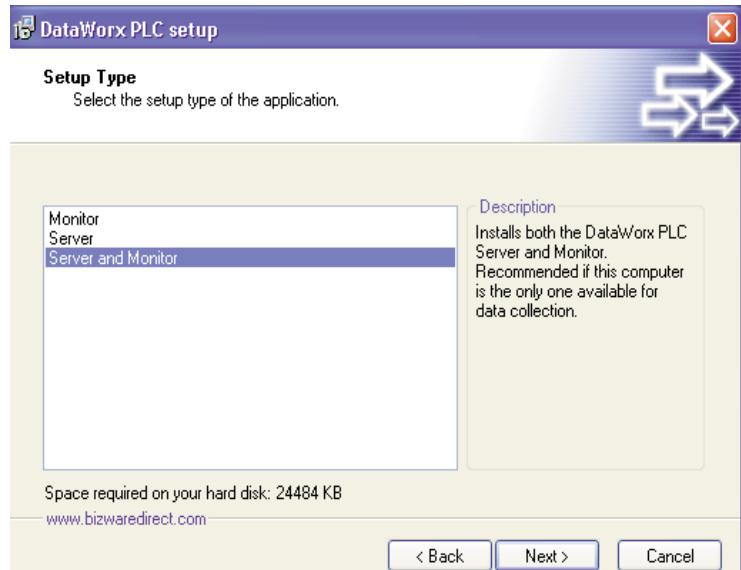
# DataWorx PLC

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A prompt for the Setup Type will appear.

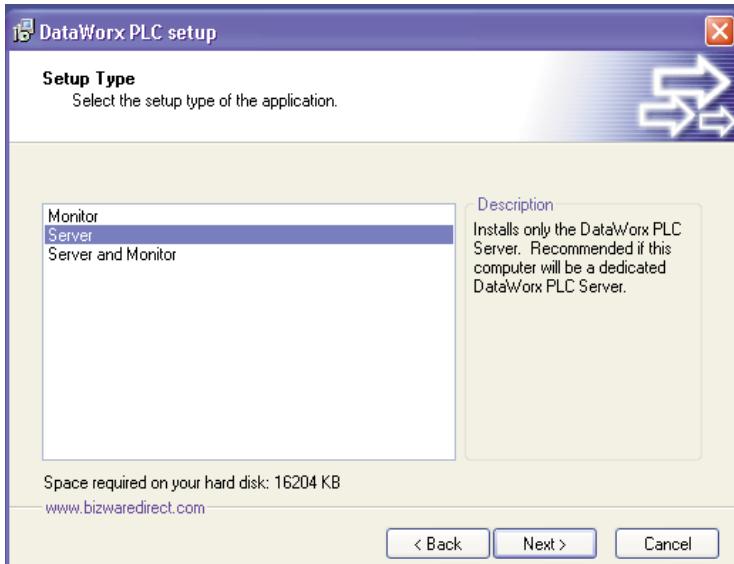
There are three Setup Types: Monitor, Server, and Server and Monitor.

When a Setup Type in the list is selected, its description will appear in the Description section to the right.

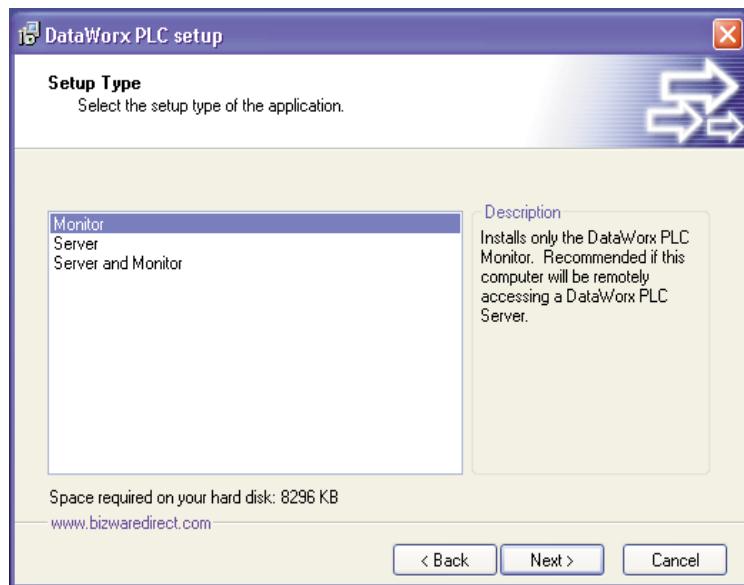


For easy installation and setup, choose to install both the Server and Monitor on the Server PC.

The example below shows the “Server Only” installation option.



The example below shows the “Monitor Only” installation option.

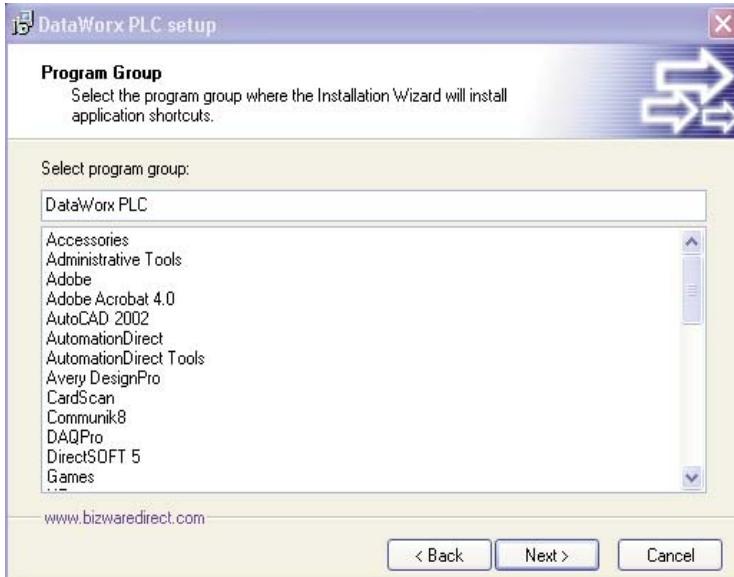


Once the Setup Type has been determined, click NEXT.

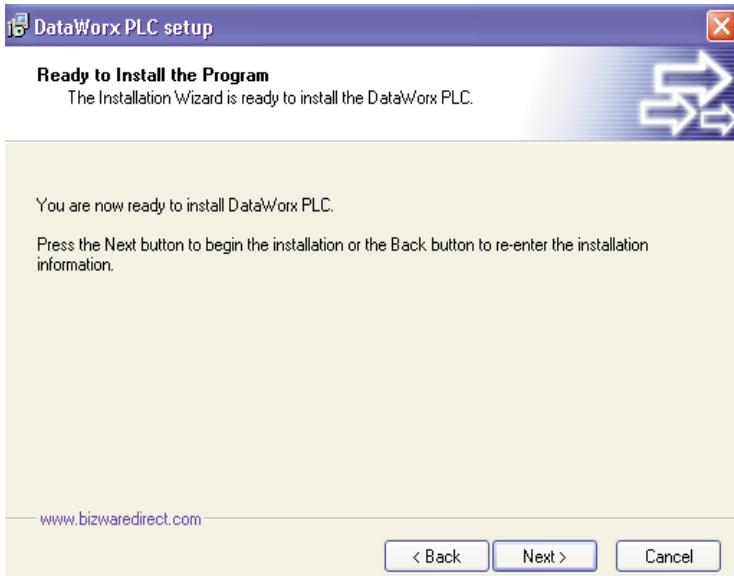
## DataWorx PLC

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A prompt for the Program Group will appear. By default the Program Group is *DataWorx PLC*. The Program Group may be changed by directly editing it.



Once the Program Group has been determined, click **NEXT**. A prompt will appear to start the installation process. It is possible to review the installation settings before committing to the install by clicking **BACK**.



Once the installation settings are satisfactory, click **NEXT**.

---

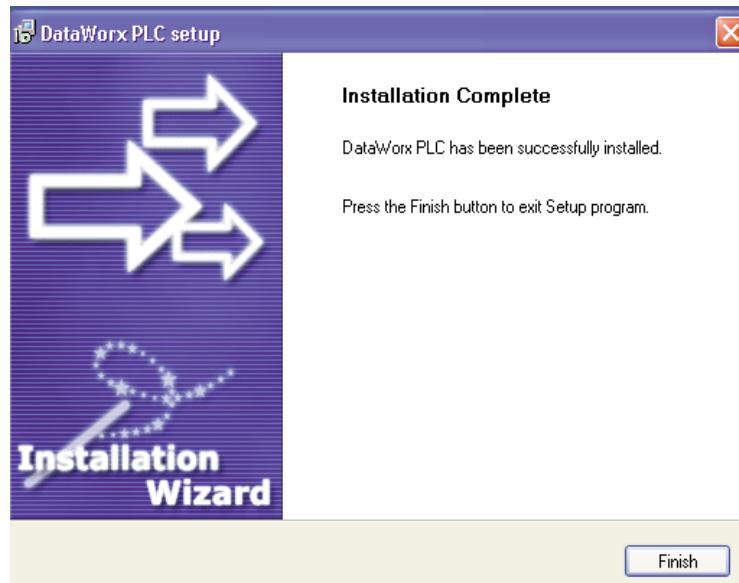
After clicking NEXT, a progress meter will appear, indicating the installation progress.



The installation can be stopped at any time, by clicking CANCEL.

Once the installation is complete, a notification will appear to confirm that the installation has been successful.

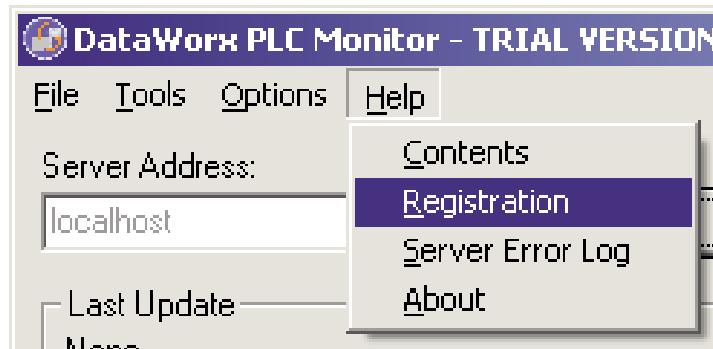
Click FINISH to close the DataWorx PLC installer.



## 3.0 Registration (required)

Registration Instructions:

- Ensure that the Server is installed and running. (See Chapter 6)
- Start the Monitor and connect to the Server. (See Chapter 6)
- Go to **HELP -> REGISTRATION**

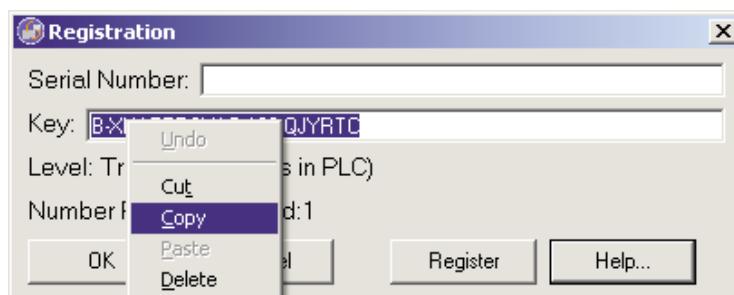


In the registration window copy the Registration Key by highlighting the Key, clicking the right mouse button and selecting **COPY**.

Registration Code:



*Note: If your PC does not have an active Internet connection, please write down the Registration Key provided in the Registration window. Then, go to a PC with an Internet connection and type the information into the web page as described below.*



With the Internet browser go to  
<http://www.bizwaredirect.com/dataworxregistration.aspx>  
Paste or enter the Registration Key into the "Key" field in the web form. Also, enter the Serial Number, which is located on the back of the CD cover, as well as your order number.

---

## DataWorx Registration Form

Serial Number (From DVD Case)

Key (From DataWorx)



*Note: The registration form is case sensitive.*

Click **CREATE REGISTRATION**. If the information was entered correctly, the new Assigned Key will appear on the web form as shown below.

Key Code:

### DataWorx Registration Form

Serial Number (From DVD Case)

Key (From DataWorx)

How did you **first**  
hear about BizWareDirect?

Please enter additional information below so we can provide more efficient technical support and alert you of product upgrades. Information submitted is for our internal purposes only and will not be shared with outside parties.

Name:

Company Name:

Address:

Address (Line 2):

City:

State:

Postal/Zip code:

Country (if other than U.S.)

Telephone:

Fax:

E-mail Address:

Purchased From:

Found registration for 3 device(s).

Your assigned key

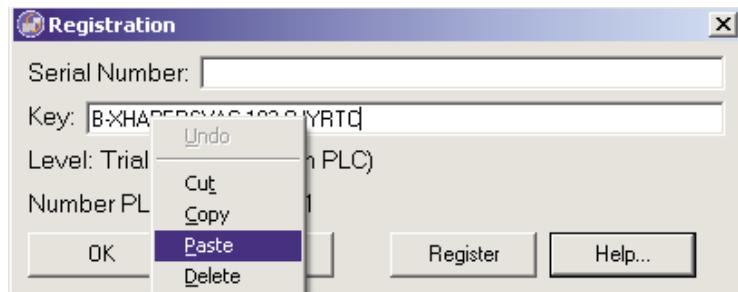
Thank you for registering!

Copy the Assigned Key from the web form.

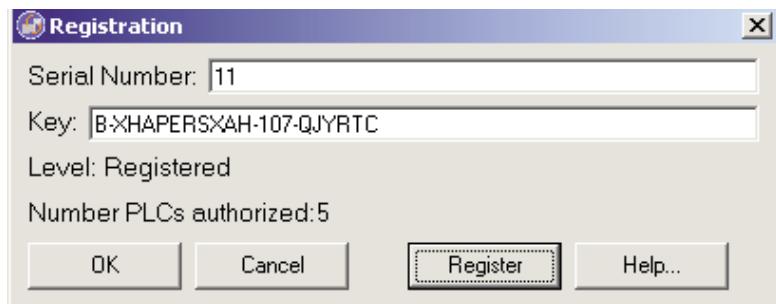
## DataWorx PLC

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From the DataWorx Monitor Registration window, paste the Assigned Key into the Key field by clicking the right mouse button and selecting PASTE.



Click REGISTER.



A confirmation message box and the Registration window will show the registration status.

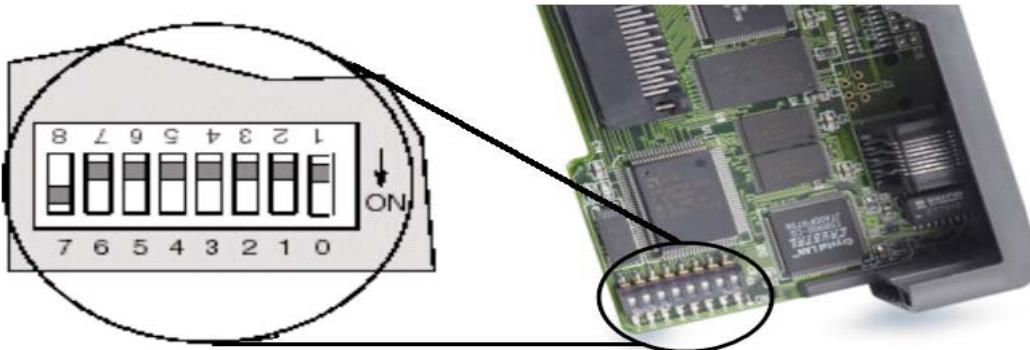


Click OK.

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## 4.0 Hardware

To enable the ECOM module to work with DataWorx software, the 8th DIP switch needs to be placed in the **ON** position, as pictured below.



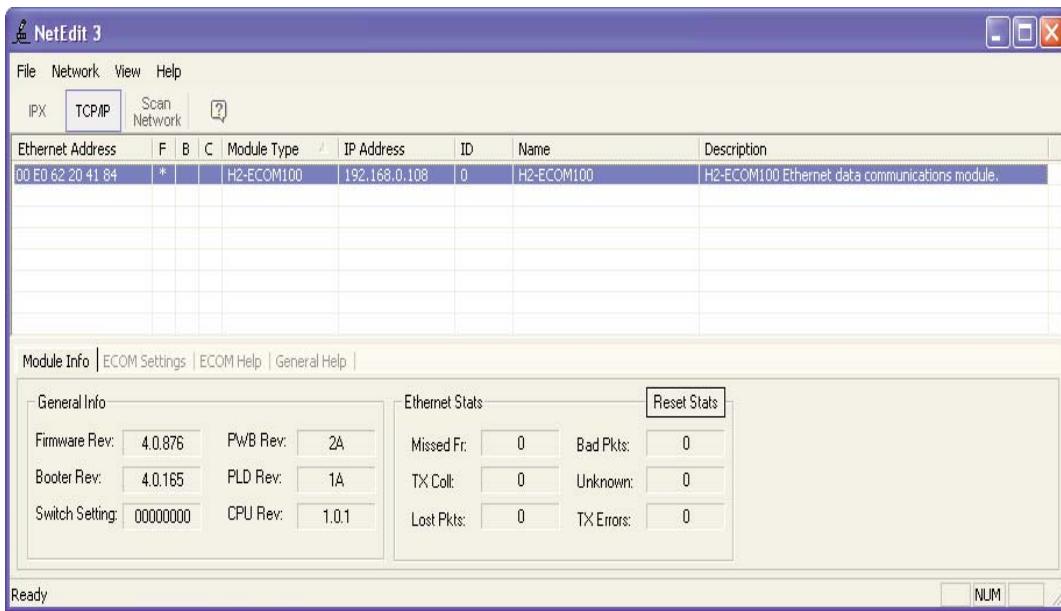
### Configuring ECOM Using NetEdit Software

- NetEdit is a software utility that may be used to set the alias, or 'Name,' and IP Address of the ECOM module.



*Note: NetEdit installs automatically with DS32 V4.0, or it can be downloaded from [www.automationdirect.com](http://www.automationdirect.com).*

- For additional information about NetEdit, see Chapter 3 in the Hx-ECOM-M manual.



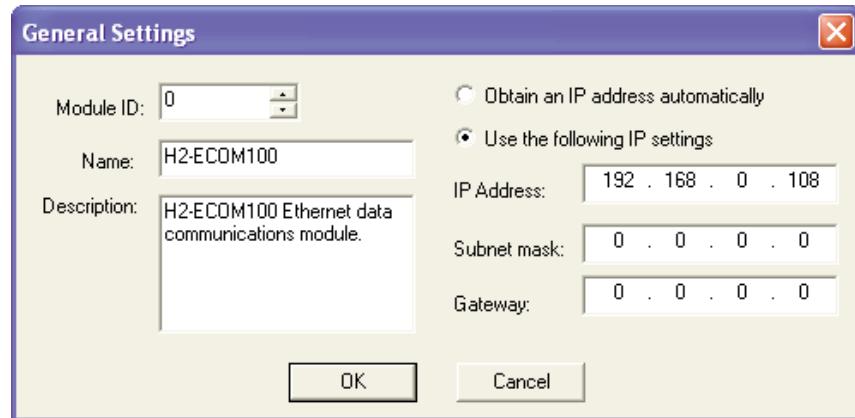
To use DataWorx, a connection must be established between the PC and the DirectLogic PLC. This connection will use the Ethernet network card in the PC to connect to an ECOM module in your PLC.

## Using NetEdit to set the ECOM's IP Address

NetEdit is used for the configuration and setup of the ECOM for use with DataWorx.

1. Use NetEdit to select the IP protocol and set the IP address on the ECOM.

- **Name** accepts 32 alphanumeric characters and is used by DataWorx as the PLC's alias.
- **Description** accepts 32 alphanumeric characters of free-form descriptive information.



- To set an IP Address, highlight the number in each of the four numerical clusters, and overwrite the number. Use the number assigned to the ECOM module by the network administrator.

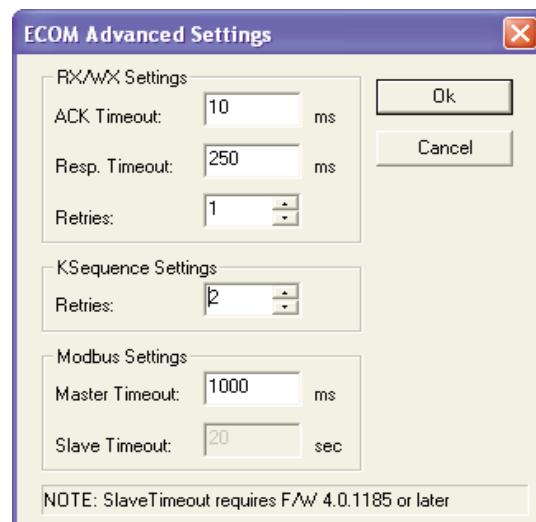


*Note: DHCP should not be used in PC or PLC.*

2. Select the advanced timing settings for sending messages across a LAN.

- The **Advanced Settings** button in the Configuration box of NetEdit (Hx-ECOM-M manual, chapter 3, page 9) opens the ECOM Advanced Settings window.

- The RX/WX Settings (Read from Network/Write to Network) section provides a place to make changes that affect PLC-to-DataWorx communications.



- **ACK Timeout** sets the time limit for receiving the acknowledge (ACK) response to an RX or WX instruction. The ECOM sends a message across the LAN. The acknowledge response comes back directly from the ECOM module receiving the transmission. **ACK Timeout** sets the maximum elapsed time in milliseconds for transmission and acknowledgement from ECOM to DataWorx across the LAN. It is not dependent on the PLC scan time.

- **Resp. Timeout** sets the maximum elapsed time in milliseconds for the receiving PLC CPU to respond to the ECOM that initiated the communication. The instruction has traveled from the initiating PLC CPU to the initiating ECOM, across the Ethernet LAN to the receiving ECOM, then to the receiving PLC CPU, and back again to the initiating ECOM. Multiple PLC scans may be required to execute an RX/WX instruction so the **Resp. Timeout** setting should allow for multiple scans. Also, communication errors may result in retries which require more time.



---

*Note: The **Resp. Timeout** setting must accommodate retries.*

---

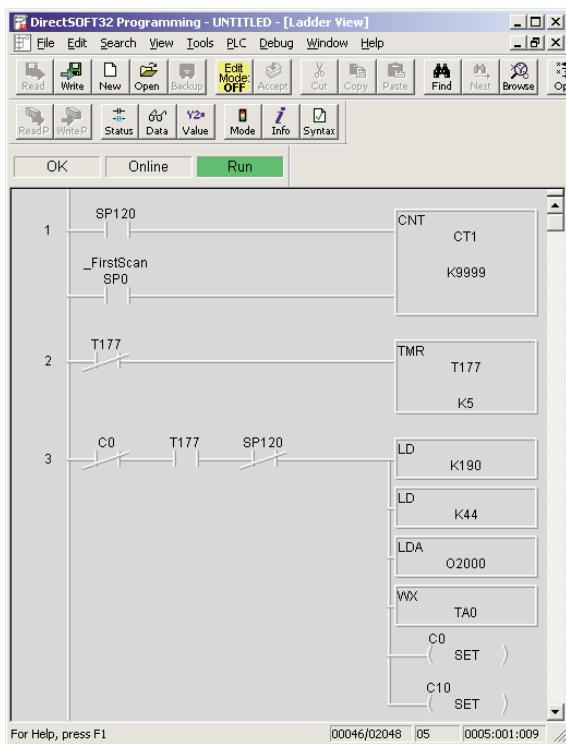
- **Retries** sets the number of times the backplane transmission between ECOM and CPU is to be retried.
- The **IP Broadcast Address** field is used to allow for non-standard broadcast address configurations. Some older Unix based systems did not use 255.255.255.255 for their broadcast address. This would prevent ECOMs from responding to network broadcast queries. Only change this value when using something other than 255.255.255.255 for broadcasts.
- The **Update Module** button loads the communication settings in the ECOM Advanced Settings window into the ECOM module's flash memory.
- The **Exit** button closes the ECOM Advanced Settings window and returns the user to the main NetEdit window.

## 5.0 Ladder Logic

Unlike similar data collection products, DataWorx PLC uses "report by exception" on the PLC. Instead of the PC polling the PLC for updated data, the PLC sends the PC data only when necessary. This eliminates waste in network bandwidth and provides a scalable architecture.

Modifications must be made to the PLC program to accommodate this operation. DataWorx PLC comes with a sample DirectSoft project that shows how to send a network message and receive a message every second.

Below is a screenshot of the sample DirectSoft project. While the first two rungs control the timer, the actual network code does not start until rung three, where the WX is used.



*Note: It may be necessary to modify the provided sample code in order to write data only when needed.*



## 5.1 WX/RX Commands

### To use the WX instruction:

1. Load the address 90 (BCD) into the high byte and the slot number of the ECOM module into the low byte. Address 90 (BCD) is required for PLC-to-PC communications with DataWorx PLC.
2. Load the number of bytes to be transferred. This will be 32+ the number of data bytes (1 - 96). Thus, the total bytes transferred will be 33 - 128.
3. Load the address of the data block used to generate the packet. **This address must be specified in HEX.**
4. Insert the WX instruction.



---

*Note: the V-memory address specified in the WX instruction will be ignored.*

---



---

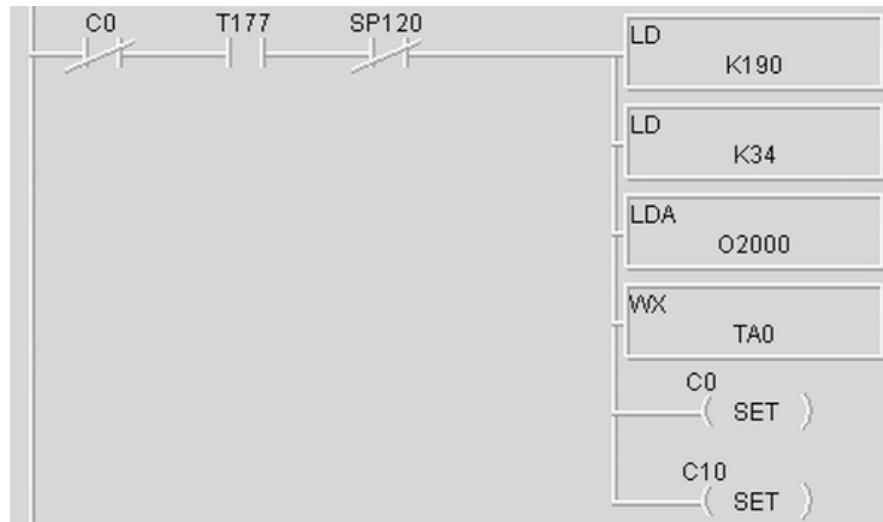
*Note: DL05/06 slots start at 1. DL205 and 405 slots start at 0. Also, see PLC Configuration Help windows on main configuration...page 47.*

---

LD K0290:	Specifies ECOM module in slot number 02 and address 90 [Note: 90 is a fixed value]
LD K0040:	Specifies 40 bytes (16 setup + 16 address + 8 data bytes)
LDA 02000:	Specifies V2000 as the address of our block of memory
WX V0000:	Perform the write (V0000 is ignored)

Example:

Below is a screenshot of the WX instruction:



On the following page is a table detailing the format of the V-memory Block needed for a WX instruction (assuming V2000).



---

*Note: You can use the DataWorx Autoconfigure feature to enter all the V memory location values. See page 48.*

---

# DataWorx PLC

V Memory Address	Contents	Value
<b>V2000 - V2007 Setup Values</b>		
V2000	Version	0
V2001	Function	1 = COMM_FUN_SEND
V2002	Media	1 = Ethernet 802.2
V2003	Protocol	1 = UDP/IP
V2004	Flags	Bit 0: COMM_FLAG_NO_WAIT_ACK Bit 1-7: Unused 1 = ACK not required for message 2 = ACK is required for message
V2005 - V2007	Reserved	0
<b>V2010 - V2017 Destination Address</b>		
V2010	Ethernet Address	First two bytes of Ethernet address to send to
V2011	Ethernet Address	Next two bytes of Ethernet address to send to
V2012	Ethernet Address	Last two bytes of Ethernet address to send to
<b>Example:</b> If destination is Ethernet address: 00 11 22 33 44 55: * V2010 = 0011 (HEX), V2011 = 2233 (HEX), V2012 = 4455 (HEX)		
V2013	IP Address	First two bytes of IP address to send to
V2014	IP Address	Last two bytes of IP address to send to
<b>Example:</b> If we are sending to IP address 192.168.0.100: The conversion to HEX is: C0.A8.00.64: V2013 = C0A8 (HEX), V2014 = 0064 (HEX)		
V2015	Socket Number	0x7777 (30583 decimal) This needs to be the same socket the PC is listening on.
V2016	Reserved	0
V2017	Reserved	0
V2020 - V2177 Message / Data to Send	User Defined	This is the block of data to send. Words are byte swapped - so that a text message entered with the Data View in DirectSOFT will be sent correctly. <b>Data must be in binary format not BCD.</b>

\*The Ethernet address and IP address of a PC running Windows can be obtained by running **ipconfig/all** from a command prompt.

## To Use the RX instruction:

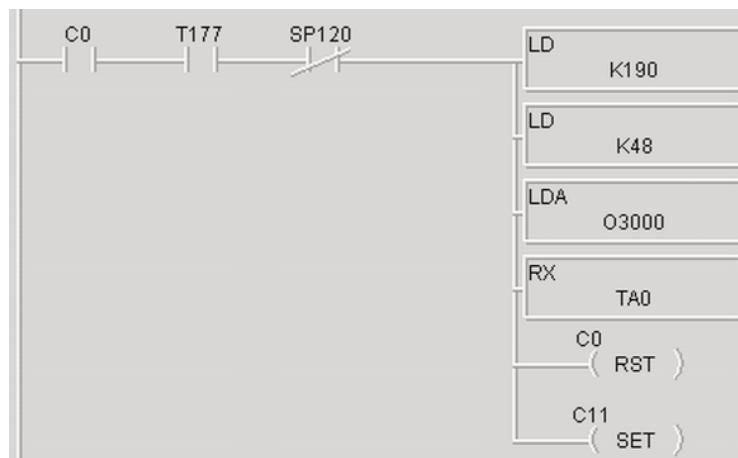
1. Load the address (90 BCD) into the low byte and the slot number of the ECOM module into the high byte.
2. Load the number of bytes to read (2 - 128) to read. Address 90 (BCD) is required for PLC-to-PC communications with DataWorx PLC.



*Note: To read only the error code, specify 2 bytes. To read the error code AND response data, specify 32 + the number of response bytes expected.*

3. Load the address where you want to store the data in the PLC. **The address must be specified in HEX.**
4. Insert the RX instruction and specify V0000 as the address from which to read.

Example: Below is a screenshot of the RX instruction.



LD K0290:	Specifies ECOM module in slot number 02 and address 90
LD K0040:	Specifies 40 bytes to read (16 setup + 16 address + 8 response bytes)
LDA 03000:	Specifies V3000 as the address to store the data
RX V0000:	Perform the read. V0000 is used to indicate that we want to read the error and response data

# DataWorx PLC

The following table details the format of the data block returned by an RX instruction (assuming V3000) when using it to read the Error and response data.

V Mem. Addr.	Contents	Value
<b>V3000 - V3007 Setup Values</b>		
V3000	Error Code (from last WX instruction execution)	0 = No Error 1 = Invalid Media Value 2 = Invalid IP address in ECOM module 3 = Invalid Protocol Specified 4 = Invalid Function Specified 5 = Invalid Version Specified 6 = Invalid Number of Bytes Specified in WX instruction must be at least 32 bytes 7 = RX/WX Overrun. Tried to issue RX/WX while one is being processed 8 = Internal ECOM Error 9 = Packet was not acknowledged by the receiver (PC) A = Timeout error waiting for the response
V3001	Number Data Bytes	Specifies number of data bytes returned by the receiver (PC)
V3002	Media	1 = Ethernet 802.2
V3003	Protocol	1 = Ether-UDP
V3004 - V3007	Reserved	0
<b>V3010 - V3017 Receiver's Address</b>		
V3010	Ethernet Address	First two bytes of receiver's Ethernet address
V3011	Ethernet Address	Next two bytes of receiver's Ethernet address
V3012	Ethernet Address	Last two bytes of receiver's Ethernet address
V3013	IP Address	First two bytes of receiver's IP address
V3014	IP Address	Last two bytes of receiver's IP address
V3015	Socket Number	Socket number the receiver is using
V3016 - V3017	Reserved	0
V3020 - V3177	Response Data	Application specific

---

### DL-05 or DL-06 PLC

The following special relay bits can be used in a 05 or 06 PLC program to monitor the Busy status of an ECOM module in a particular slot of a **05 or 06 Series PLC**.

Local Base
SP120 Module Busy Slot 1
SP122 Module Busy Slot 2
SP124 Module Busy Slot 3
SP126 Module Busy Slot 4

### DL-205 PLC

The following special relay bits can be used in a 205 PLC program to monitor the Busy status of an ECOM module in a particular slot of a **205 Series PLC**.

Local Base
SP120 Module Busy Slot 0
SP122 Module Busy Slot 1
SP124 Module Busy Slot 2
SP126 Module Busy Slot 3
SP130 Module Busy Slot 4
SP132 Module Busy Slot 5
SP134 Module Busy Slot 6
SP136 Module Busy Slot 7

## DL-405 PLC

The following special relay bits may be used in a 405 PLC program to monitor the Busy status of an ECOM module in a particular slot of a 405 Series PLC.

Local Base
SP120 Module Busy Slot 0
SP122 Module Busy Slot 1
SP124 Module Busy Slot 2
SP126 Module Busy Slot 3
SP130 Module Busy Slot 4
SP132 Module Busy Slot 5
SP134 Module Busy Slot 6
SP136 Module Busy Slot 7

Expansion Base #1	Expansion Base #2	Expansion Base #3
SP140 Module Busy Slot 0	SP160 Module Busy Slot 0	SP200 Module Busy Slot 0
SP142 Module Busy Slot 1	SP162 Module Busy Slot 1	SP202 Module Busy Slot 1
SP144 Module Busy Slot 2	SP164 Module Busy Slot 2	SP204 Module Busy Slot 2
SP146 Module Busy Slot 3	SP166 Module Busy Slot 3	SP206 Module Busy Slot 3
SP150 Module Busy Slot 4	SP170 Module Busy Slot 4	SP210 Module Busy Slot 4
SP152 Module Busy Slot 5	SP172 Module Busy Slot 5	SP212 Module Busy Slot 5
SP154 Module Busy Slot 6	SP174 Module Busy Slot 6	SP214 Module Busy Slot 6
SP156 Module Busy Slot 7	SP176 Module Busy Slot 7	SP216 Module Busy Slot 7

## 5.2 Do-more PLC support

DataWorx now has direct support for the Do-more PLC. This section contains instructions on how to configure DataWorx for use with the Do-more PLC.



*Note: You will need DataWorx version 2.2 build 99 or higher and an H2-DM1E for this exercise.*



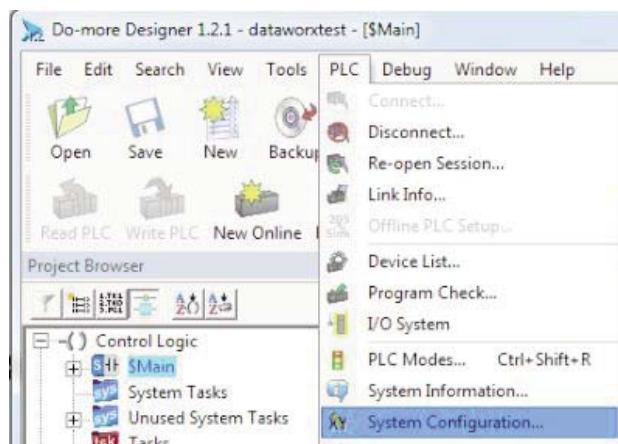
*Note: The Do-more PLC must have firmware version 1.1.2 or higher with a Booter version of 3.0.5 or higher for proper operation with DataWorx.*

In Do-more Designer we will first create a UDP device that will be used in the PACKETOUT instruction.



*Note: Ensure you have assigned an IP address to the Do-more CPU either in NetEdit or under System Information in Do-more Designer.*

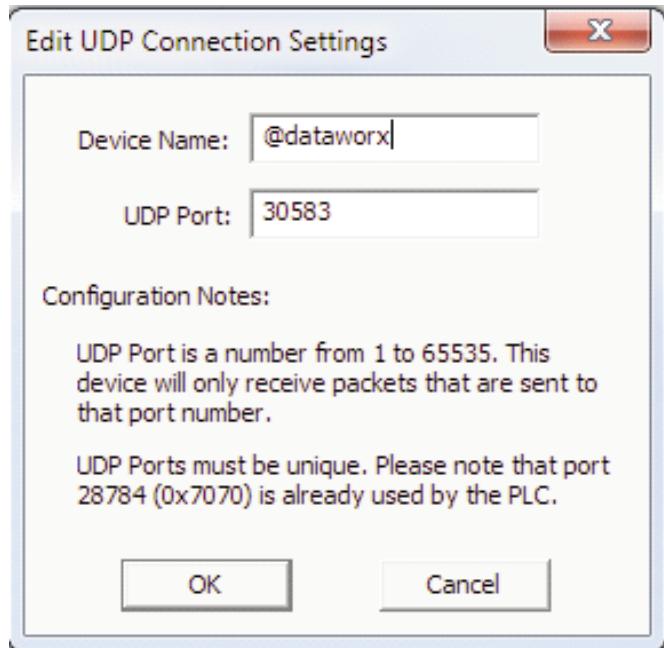
1. Click on PLC from the menu bar > then click on System Configuration.



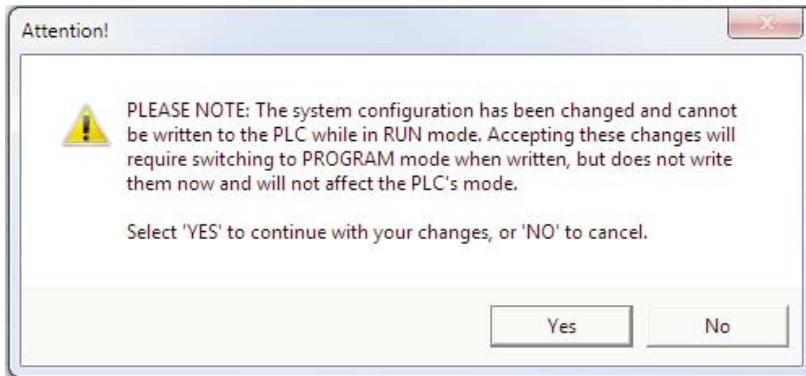
2. Now select Device Configuration > then select New Device.
3. In the Device name field enter '@dataworx', and in the UDP port field enter '30583' > then hit OK > then hit OK once again to close out the window.

# DataWorx PLC

---



4. Select 'Yes' to the following pop up window.



5. Next, on a empty rung enter a 'PACKETOUT' Instruction and fill in the fields with the below information:

- a. Device: Select the newly created '@dataworx device'.
- b. IP Address: Select Fixed and enter the IP address of the PC running DataWorx.
- c. To UDP Port Number: Enter '30583' (port number DataWorx is listening to).
- d. Data Start: Select Numeric Data Block and enter: (These will match our DataWorx setup in a later step)

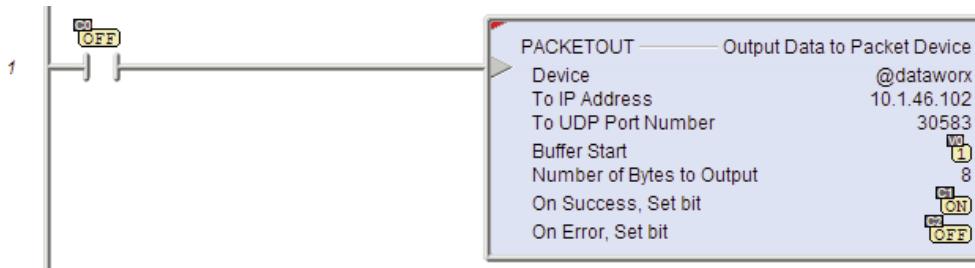
---

- i. Buffer Start = V0.
- ii. Number of Bytes to Output = 8 (This will match our DataWorx setup in a later step).
- e. On Success: Leave as default or select an unused C bit.
- f. On Error: Leave as default or select an unused C bit.
- 6. Select the green checkmark to accept your selections.
- 7. Now for the input leg to the PACKETOUT instruction enter a Normally Open contact (F2) and assign an input or bool bit.



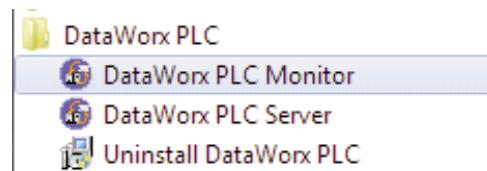
*Note: Do not send data from the Do-more PLC to the DataWorx software using anything faster than a 500 msec update rate.*

- 8. Accept and Download this to the Do-more CPU.



In these next steps we will set up the DataWorx configuration.

- 9. Open DataWorx PLC Monitor



- 10. Now click on Options > Configure Server > then Add.
- 11. Use DataWorx to setup the PLC Configuration:
  - a. IP Address: enter IP address of your Do-more CPU.
  - b. Data Directory: Select a directory in which you would like the .csv file stored.

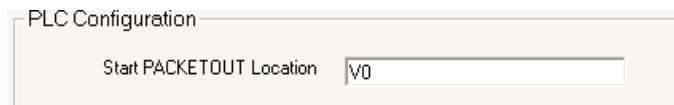
# DataWorx PLC

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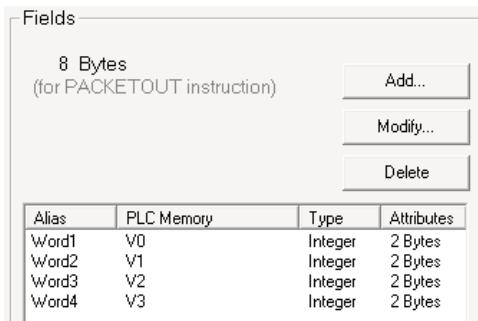
c. Do-more PLC: Check this box.

**Do-more PLC**

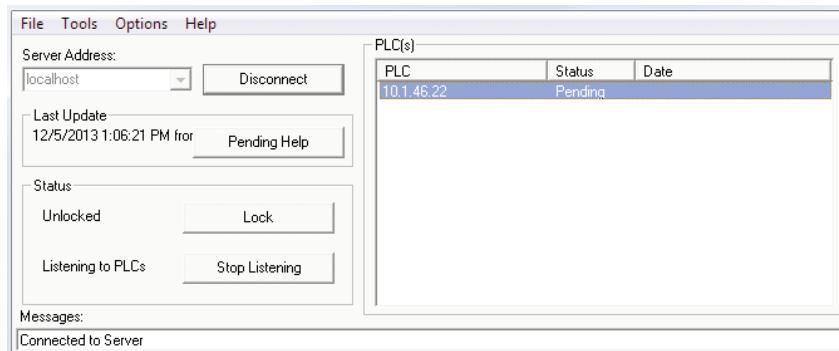
d. PLC Configuration: Enter 'V0'.



12. Select Add and enter four (Integer)2 byte words starting with V0.

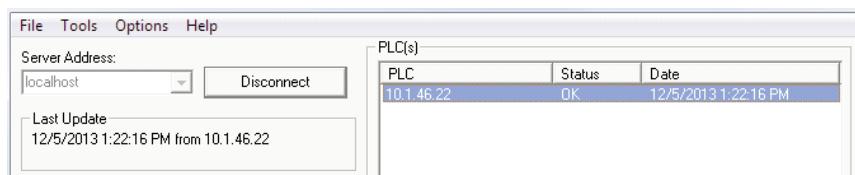


13. Select OK to finish the configuration.



14. Now trigger the input rung to the PACKETOUT instruction in the Do-more PLC.

15. You should get the below update in the DataWorx window:



16. Now open the excel .csv file in the Data Directory we set up in step 11.b and verify the data was written.

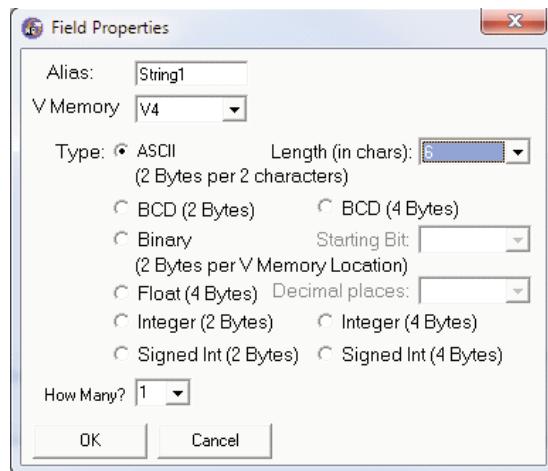
---

The following steps demonstrate how to send fixed length String (ASCII) data from the Do-more PLC to the DataWorx software:

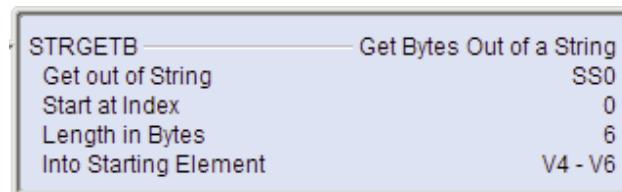


*Note: Close the .csv file, if open from the previous section, prior to proceeding.*

1. Open DataWorx Monitor > Connect > right click on device > configure.
2. Next click on Add, then configure the following settings:



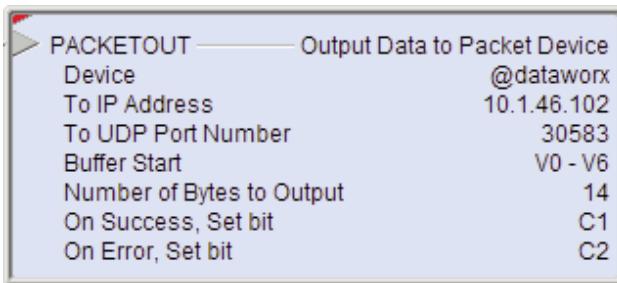
3. Click on OK.
4. Open the Do-more project used in the previous section, if not already open, and go online.
5. On Rung 1 insert a STRGETB instruction before the PACKETOUT instruction.
6. Configure the STRGETB with the following settings:



7. Add/Modify the PACKETOUT settings as seen on the following page:

# DataWorx PLC

---



8. Rung 1 should now look like the following:



9. Accept the changes > Write them to the PLC.
10. Open Dataview > Enter SS0 into the Element field > in the Edit field enter 'abc123' and select Write Edits.
11. Delete the .csv file stored in the DataWorx Data Directory we set up in step 11 b.



*Note: This will allow a new .csv to be created once new data is received.*

---

12. Trigger the C0 contact.
13. Now open the excel .csv file stored in the Dataworx Data Directory and verify the data was written.
14. You should now see the previous V0-V3 and the new String1 data 'abc123' in your file.



*Note: If a new .csv was not created or the data was not written, verify your setup and try again.*

---

## 6.0 DataWorx PLC

### 6.1 Server

#### Overview

The DataWorx PLC Server's primary functions entail listening for PLC data and recording the data into text files in the user-specified format.

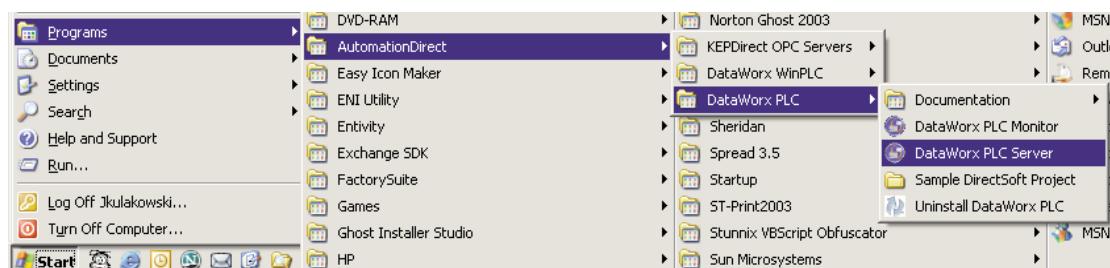
The format of the text file is specified using the DataWorx PLC Monitor. For more information on configuring the Server with the Monitor, refer to section 6.2.

#### 6.1.1 Installing Service

The DataWorx PLC Server must first be installed and running in order for it to operate without user intervention. Installing the Server is a simple process:

Go to the START button, then select:

**PROGRAMS -> AUTOMATIONDIRECT ->  
DATAWORX PLC -> DATAWORX PLC SERVER**



## DataWorx PLC

---

The DataWorx PLC Server window will open. If the Server has not yet been installed, the Server Status will display as “Not Installed.”



Click **INSTALL**. The DataWorx PLC Server window will update and display the Server Status as “Installed, Stopped.”

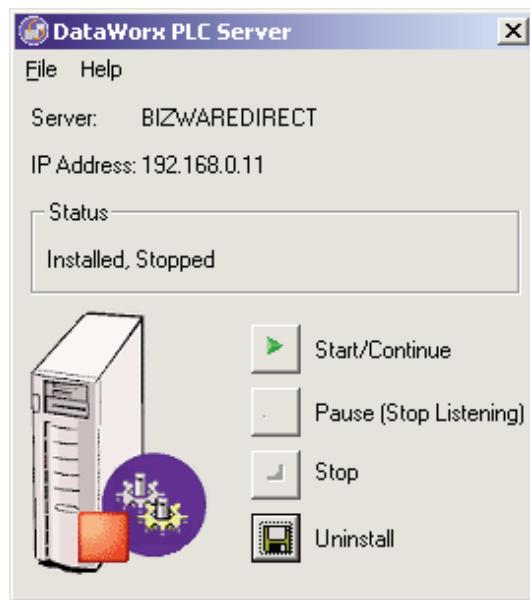
The “Start/Continue” button will be enabled and the former “Install” button will now display as “Uninstall.”



---

*Note: This does not start the DataWorx PLC Server. To start the Server refer to “Running Service,” in section 6.1.2.*

---

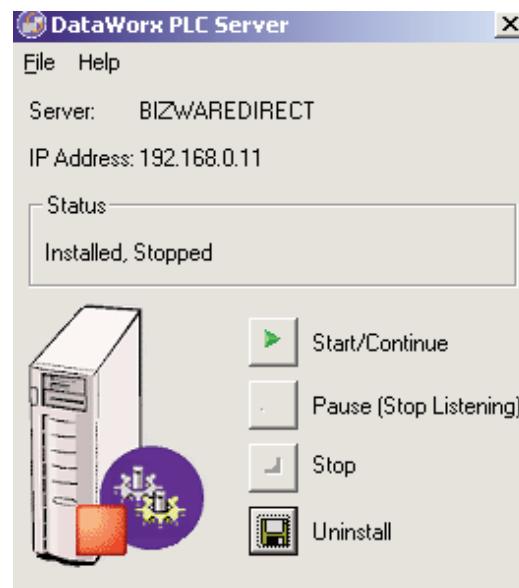


## 6.1.2 Running Service

If the DataWorx PLC Server Window is not open, go to the START button, then select:  
**PROGRAMS -> AUTOMATIONDIRECT -> DATAWORX PLC -> DATAWORX PLC SERVER**



The DataWorx PLC Server window will open. If the Server has already been installed, the Server Status will display as "Installed; Stopped."



Click START/CONTINUE to start the Service. The status will update to "Installed, Running."



*Note: If the DataWorx PLC Server has not yet been installed, refer to "Installing Service," in section 6.1.1.*

### 6.1.3 Multiple Network Adapters

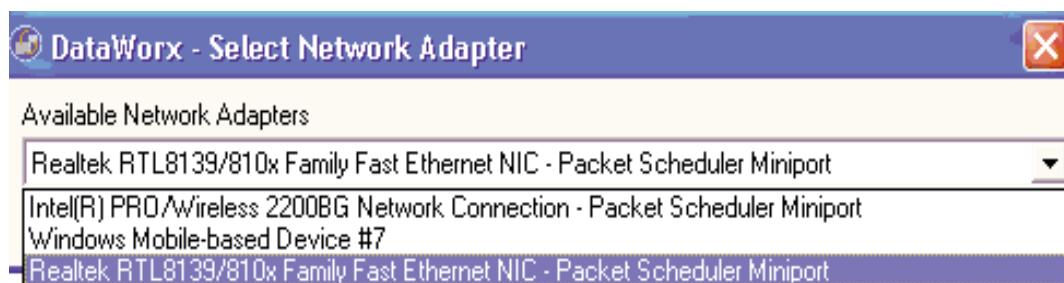
If there is more than one network adapter available on the server PC, it will be necessary to ensure that the appropriate network adapter is being used by DataWorx PLC Server..

From the toolbar, select:

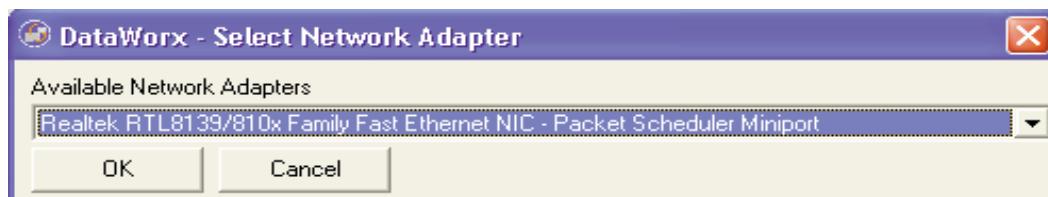
FILE ->  
NETWORK  
ADAPTER



The Select Network Adapter window will open.



Click in the Available Network Adapters field to view the list of network adapters available for the server PC. Select the appropriate network adapter from the list.



Click OK.

## 6.1.4 Pausing

Pausing forces the Server to stop listening for PLC input. This can be useful when configuring the Server because it will prevent unwanted data from being stored.

If the DataWorx PLC Server Window is not open, go to the **START** button, then select:

**PROGRAMS -> AUTOMATIONDIRECT ->  
DATAWORX PLC -> DATAWORX PLC SERVER**



The DataWorx PLC Server window will open. If the Server is already installed and running, the Server Status will display as "Installed; Running."



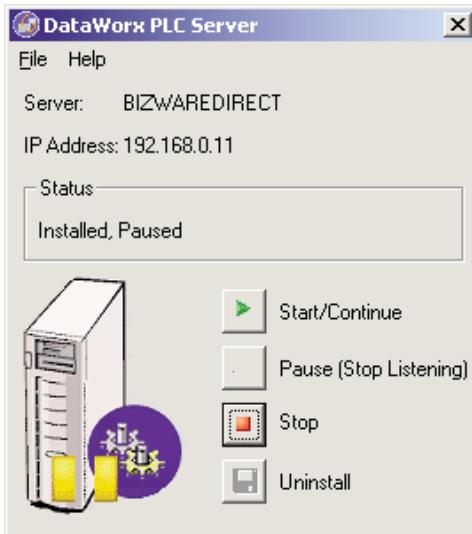
*Note: If the DataWorx PLC Server has not yet been installed, refer to "Installing Service," in section 6.1.1.*

# DataWorx PLC

Click PAUSE (STOP LISTENING). The Status will update to “Installed, Paused.”



*Note: Pausing does not stop the DataWorx PLC Server. To stop the Server refer to “Stopping Service,” in section 6.1.5.*



## 6.1.5 Stopping Service

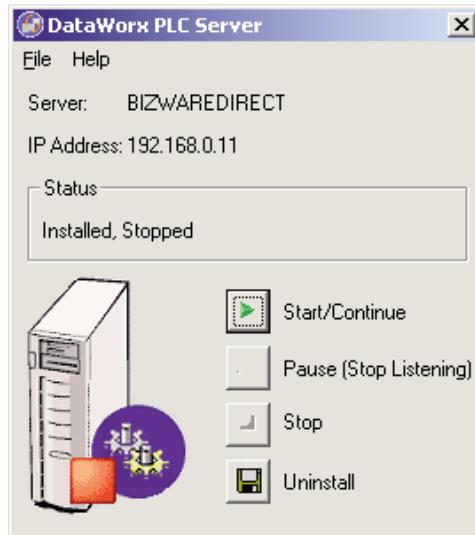
Stopping the DataWorx Server completely stops the program, instead of merely stopping its listening state. This feature is useful because the Server must be stopped before it can be uninstalled.

If the DataWorx Server window is not open, go to the START button, then select:

PROGRAMS -> AUTOMATIONDIRECT ->  
DATAWORX PLC -> DATAWORX PLC SERVER



In the DataWorx PLC Server Window, click STOP. The Status will update to “Installed, Stopped.” Only the buttons labeled “Start/Continue” and “Uninstall” will be enabled.



## 6.1.6 Viewing the Error Log

The DataWorx PLC Server maintains an error log to use as a diagnostic tool for troubleshooting.

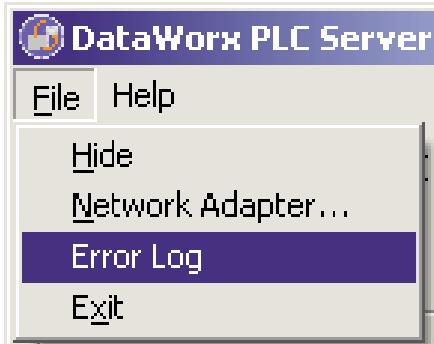
If the DataWorx PLC Server window is not open, go to the START Button, then select:  
**PROGRAMS -> AUTOMATIONDIRECT -> DATAWORX PLC -> DATAWORX PLC SERVER**



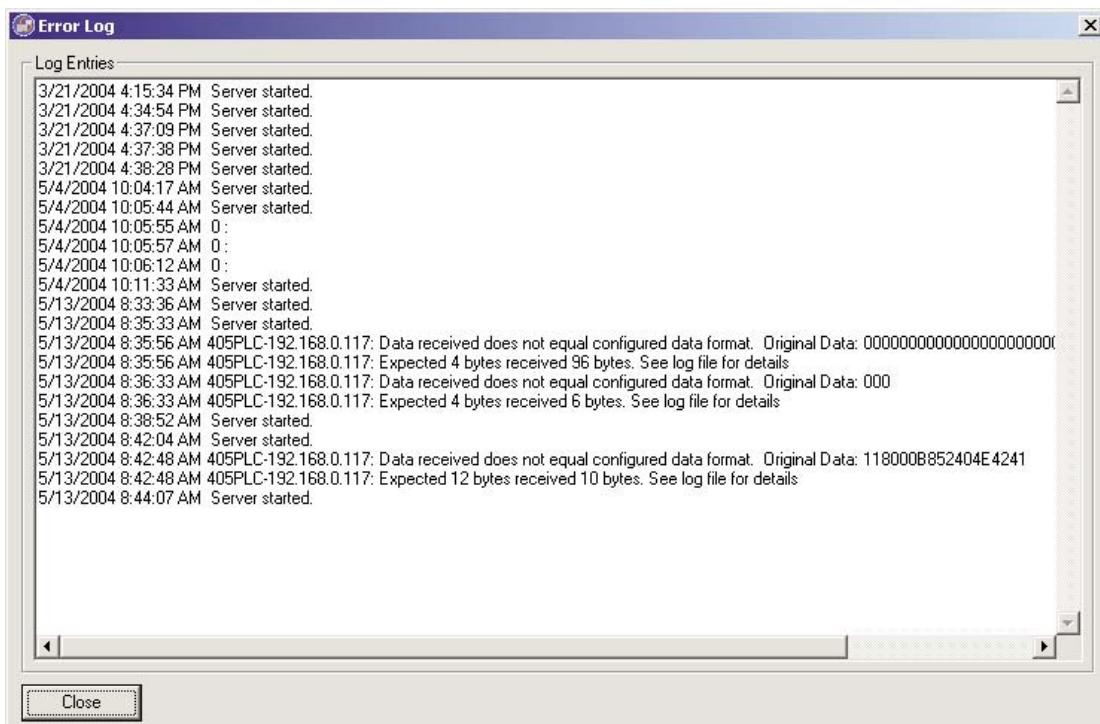
# DataWorx PLC

---

In the DataWorx PLC Server window, go to menu:  
FILE -> ERROR LOG



The Error Log window will open.



The Error Log window contains any error messages that were generated by the Server and Monitor programs. It serves as a useful troubleshooting tool.

---

## 6.1.7 Hiding

Hiding is a convenient feature for temporarily placing the Server window out of view on the desktop for later access. From the menu, select:

FILE -> HIDE



The DataWorx PLC icon will appear on the task bar.



The user can restore the application by right clicking on the DataWorx PLC icon and selecting "Restore."



### 6.1.8 Uninstalling Service

Occasionally, for troubleshooting purposes it may be necessary to uninstall the DataWorx PLC Server entirely.

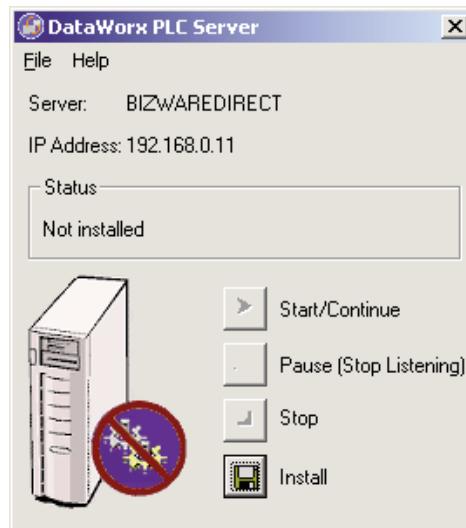
If the DataWorx PLC Server window is not open, go to the START button, then select:

**PROGRAMS -> AUTOMATIONDIRECT ->  
DATAWORX PLC -> DATAWORX PLC SERVER**



*Note: The Server must already be stopped. Refer to “Stopping Service,” in section 6.1.5.*

From the DataWorx PLC Server window, click UNINSTALL. The Server Status will update to “Not Installed.”



## 6.2 Monitor

### Overview

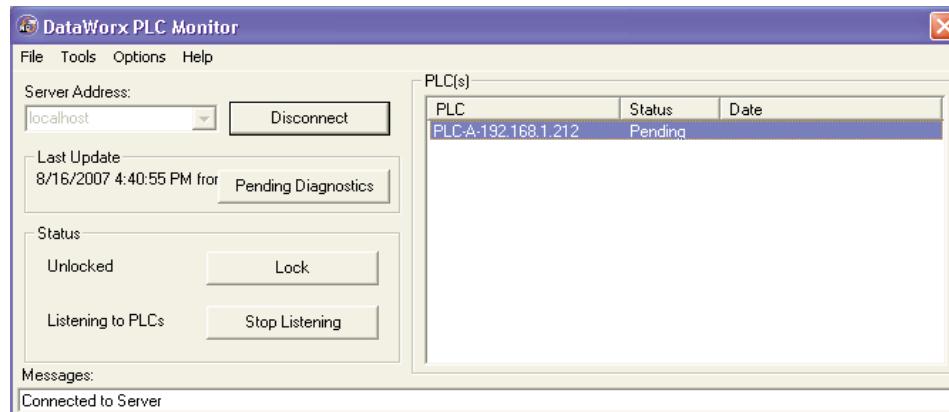
The DataWorx PLC Monitor's primary functions entail configuring the DataWorx PLC Server, retrieving its data files over the network and enabling troubleshooting for individual PLCs.

To open the DataWorx PLC Monitor window, go to the START button, then select:

**PROGRAMS -> AUTOMATIONDIRECT ->  
DATAWORX PLC -> DATAWORX PLC MONITOR**

The DataWorx PLC Monitor window will open. If no PLCs have been configured, then the PLC(s) list will be empty.

In the example below, the Monitor is connected to the DataWorx Server and one PLC has already been configured for the Server.



## DataWorx PLC

---

Below is an explanation of each field in the DataWorx PLC Monitor window.

**Server Address:** Denotes the address of the DataWorx PLC Server PC.

**Last Update:** Displays the time of the most recent PLC communication.

**Pending Diagnostics:** If the Server cannot establish communication with a PLC, then a button labeled “Pending Diagnostics” will appear in the Last Update section and the status in the PLC section will display as Pending. This button is used for troubleshooting. For further details, please refer to Troubleshooting, Chapter 7 of this manual.

**Status:** Displays the DataWorx PLC Server’s locked and listening states.

**PLC(s):** Lists the currently configured PLCs for the selected DataWorx Server along with the respective status.



*Note: PLC(s) lists the last update; check the date to verify that information is being received as expected.*

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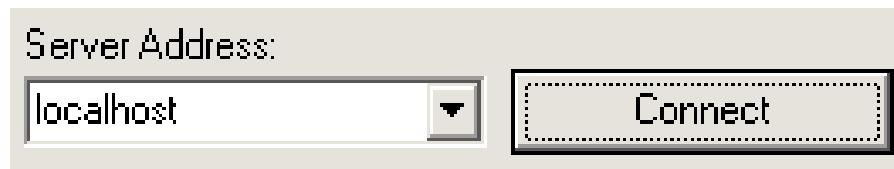
**Messages:** Displays updates from both the Server as well as from the Monitor itself.

## 6.2.1 Connecting to the Server

Connecting to the DataWorx PLC Server is necessary in order to configure the Server and retrieve its data files.

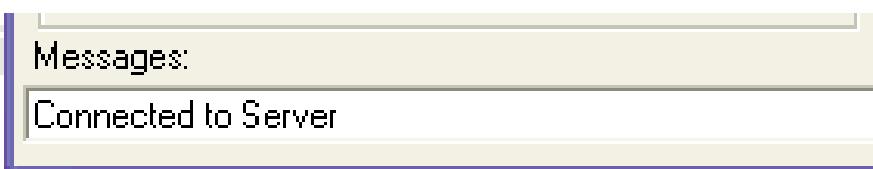
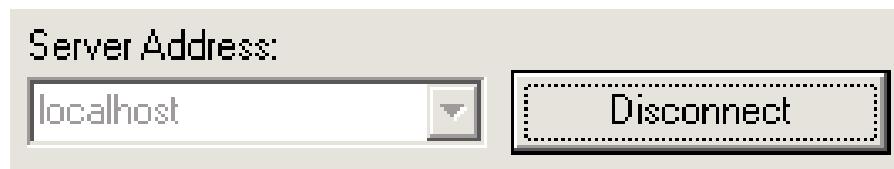
In the main Monitor window, the Server Address field will automatically default to the localhost option.

If the DataWorx PLC Server is installed on the same PC as the DataWorx PLC Monitor program, then the localhost option is appropriate. Otherwise, enter the IP Address of the DataWorx Server PC into the Server Address field or select it from the available list.



Click CONNECT to connect to the DataWorx PLC Server.

If the connection is successful, the "Connect" button label will update to "Disconnect" and the Messages field will display "Connected to Server."



### 6.2.2 Configuring the Server



*Note: Before configuring the Server, the user must connect to it from the main Monitor window.*

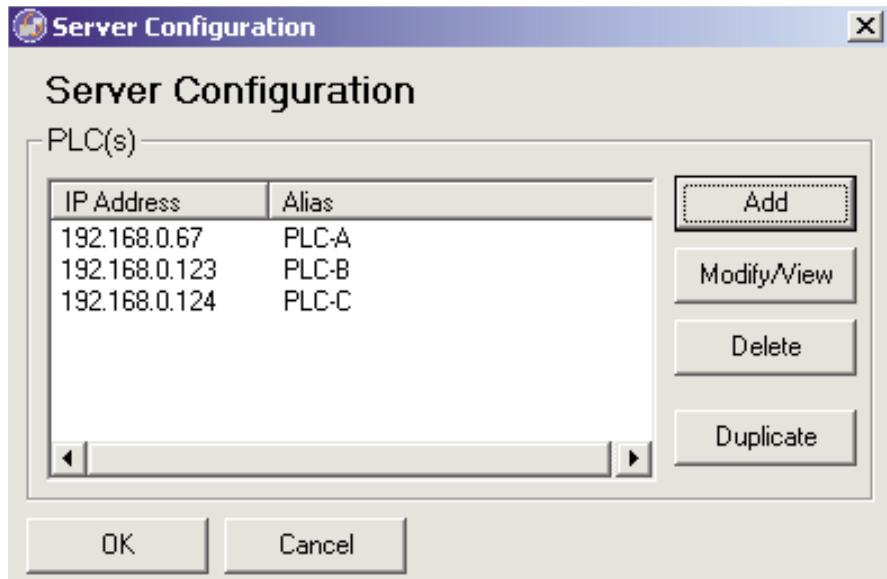
Go to menu:

OPTIONS -> CONFIGURE SERVER



The Server Configuration window will open. If no PLCs have been configured, then the PLC list will be empty.

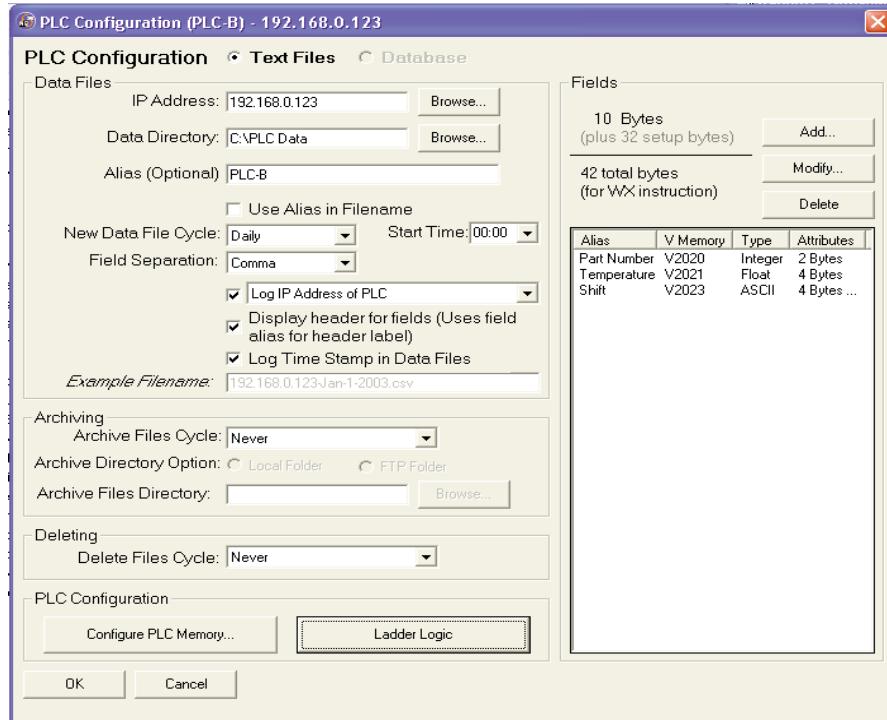
In the example below, three PLCs have already been configured for the Server.



To add a PLC, click ADD.

A PLC Configuration window similar to the following will open, with the “Text Files” option selected by default.

The example below reflects information that has already been filled in by the user.



Below is an explanation of each field in the PLC Configuration window.

**IP Address:** Denotes the IP Address of the PLC

**Data Directory:** Designates the folder on the Server where all the input from the PLC will be stored

**Alias:** Optional name for the PLC - can be useful compared to remembering cryptic IP Addresses

**Use Alias in Filename:** If set, the Server will use the Alias instead of the IP Address field in naming the PLC data files

**New Data File Cycle:** Specifies how often the Server will create a new file for the PLC data, and has the following options: Daily, 2 Shifts, 3 Shifts, Monthly, Yearly and Never (one file). The user may specify that all logged data be kept in a single file by selecting “Never (one file).”

**Start Time or Shift 2 Starts:**

- When the New Data File Cycle is set to “Daily,” then the field is labeled “Start Time.” The time entered into the Start Time field indicates at what time on a daily basis a new data log file will be created.
- When the New Data File Cycle is set to “2 Shifts” or “3 Shifts,” then the field label is “Shift 2 Starts.” Specifies the start time of the 2nd shift and is used to calculate the start times of any other shifts, with each shift lasting 12 hours for the “2 Shifts” option and 8 hours for the “3 Shifts” option. For more details on this field refer to the Shift Information chart on Page 45.

**Field Separation:** The data segments received from the PLC need to be separated from each other inside of the text file. Currently, a comma or a tab may be used to separate the segments.

**Log IP Address of PLC:** When the check box is set and this option is selected from the drop-down list, the Server will record the IP Address of the PLC along with the data received from the PLC to the text file.

**Log Alias of PLC:** When the check box is set and this option is selected from the drop-down list, the Server will record the Alias of the PLC along with the data received from the PLC to the text file.

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**Display header for fields:** When set, it indicates that the Server will record the header information labeling each column along with the PLC data to the text file.

**Log Time Stamp in Data Files:** When set, it indicates that the Server will record the time stamp to the text file.

**Example Filename:** Based on the combination of the following fields, it displays an example name for the data log file in which the PLC data is being stored: New Data File Cycle, Use Alias in Filename, Field Separation, IP Address, and Alias.

**Archive Files Cycle:** Specifies how often ZIP file archives of the data log files will be created, and has the following options: Daily, Monthly, Yearly or Never.

**Archive Directory Option:** Indicates whether the location of the ZIP file archives is a Local Directory on the DataWorx Server C: drive or an FTP location.

**Archive Files Directory or FTP Location:**

This field is labeled “Archive Files Directory” when the Archive Directory Option “Local Folder” is set. The BROWSE button allows the user to select a folder on the Server.

This field is labeled “FTP Location” when the Archive Directory Option “FTP Folder” is set. The SETTINGS button allows the user to specify the FTP connection settings: Server URL, User Name and Password.

**Delete Files Cycle:** Enables the deletion of the data files every day, month or year.

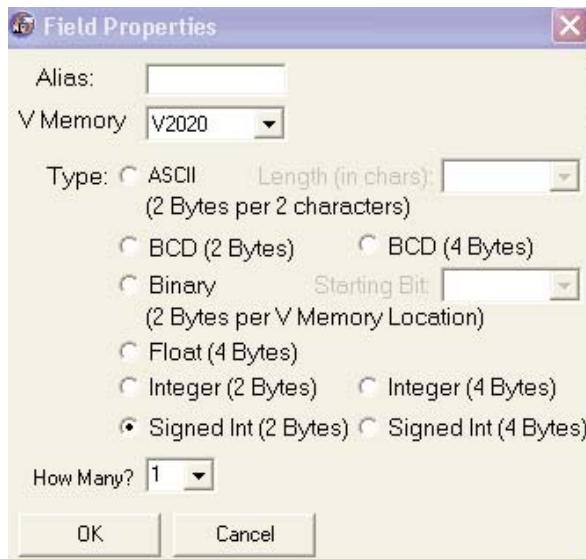
**Configure PLC Memory:** Allows the user to automatically configure the PLC to send data to the Server.

**Ladder Logic:** Provides a dynamic example of the ladder logic required to send data to DataWorx.

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**Fields:** Lists configured data fields and respective VMemory locations for data that the PLC is sending. The example above reflects fields that have already been filled in by the user. Use the Add, Modify, and Delete buttons to define the data fields.

- To create a new field, click ADD. The Field Properties window will open.



- **Alias:** This optional field is useful for describing the type of information being sent by the PLC.
- **VMemory:** The user must choose a VMemory location in order for DataWorx to expect the appropriate information.
- **Type:** Allows the user to specify the data type of the information coming from the PLC.
- **How Many?:** Allows the user to create more than one consecutive field of the same data type.
- To create the specified field, click **OK**. Otherwise, to discard the new field, click **CANCEL**.

- To edit an existing field, select the field and click **MODIFY**. The Field Properties window will open, displaying the field's settings. Once the edits have been made, either click **OK** to save the changes, or click **CANCEL** to discard the changes.
- To delete an existing field, select the field and click **DELETE**. The field will no longer appear in the Fields list.

## Shift Information

The Shift Information table below provides five examples to illustrate how each combination of the “New Data File Cycle” field and the “Start Time” or “Shift 2 Starts” field determines each shift’s start and end time.

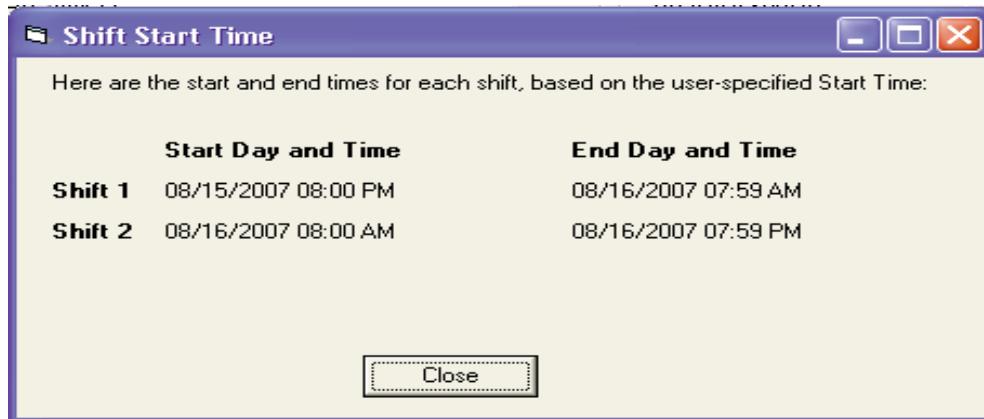
Example Number	New Data File Cycle	Start Time (Today)	Shift 2 Starts (Today)	Shift # and Duration (hours)	Shift Start Time and Day	Shift End Time and Day
(1)	Daily	Midnight	n/a	1 (24 hours)	Midnight Today	11:59 PM Today
(2)	Daily	Noon	n/a	1 (24 hours)	Noon Today	11:59 AM Tomorrow
(3)	2 Shifts	n/a	8:00 AM	1 (12 hours)	8:00 PM Yesterday	7:59 AM Today
				2 (12 hours)	8:00 AM Today	7:59 PM Today
(4)	3 Shifts	n/a	8:00 AM	1 (8 hours)	Midnight Today	7:59 AM Today
				2 (8 hours)	8:00 AM Today	3:59 PM Today
				3 (8 hours)	4:00 PM Today	11:59 PM Today
(5)	3 Shifts	n/a	6:00 AM	1 (8 hours)	10:00 PM Yesterday	5:59 AM Today
				2 (8 hours)	6:00 AM Today	1:59 PM Today
				3 (8 hours)	2:00 PM Today	9:59 PM Today

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## DataWorx PLC

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In the PLC Configuration window, when the “Start Time” or “Shift 2 Starts” field is edited, the Shift Start Time window will open displaying the resulting shift information, with one line per shift. The example below reflects the current day of August 16th, and the user has set the New Data File Cycle to 2 Shifts with a Shift 2 Starts time of 8:00AM.



Click CLOSE to close the Shift Start Time window.

## **6.2.3 PLC Configuration Help**

### **Ladder Logic**

To assist with PLC memory configuration and V memory data setup, a Ladder Logic window is available.

From the PLC Configuration window, click **LADDER LOGIC**.



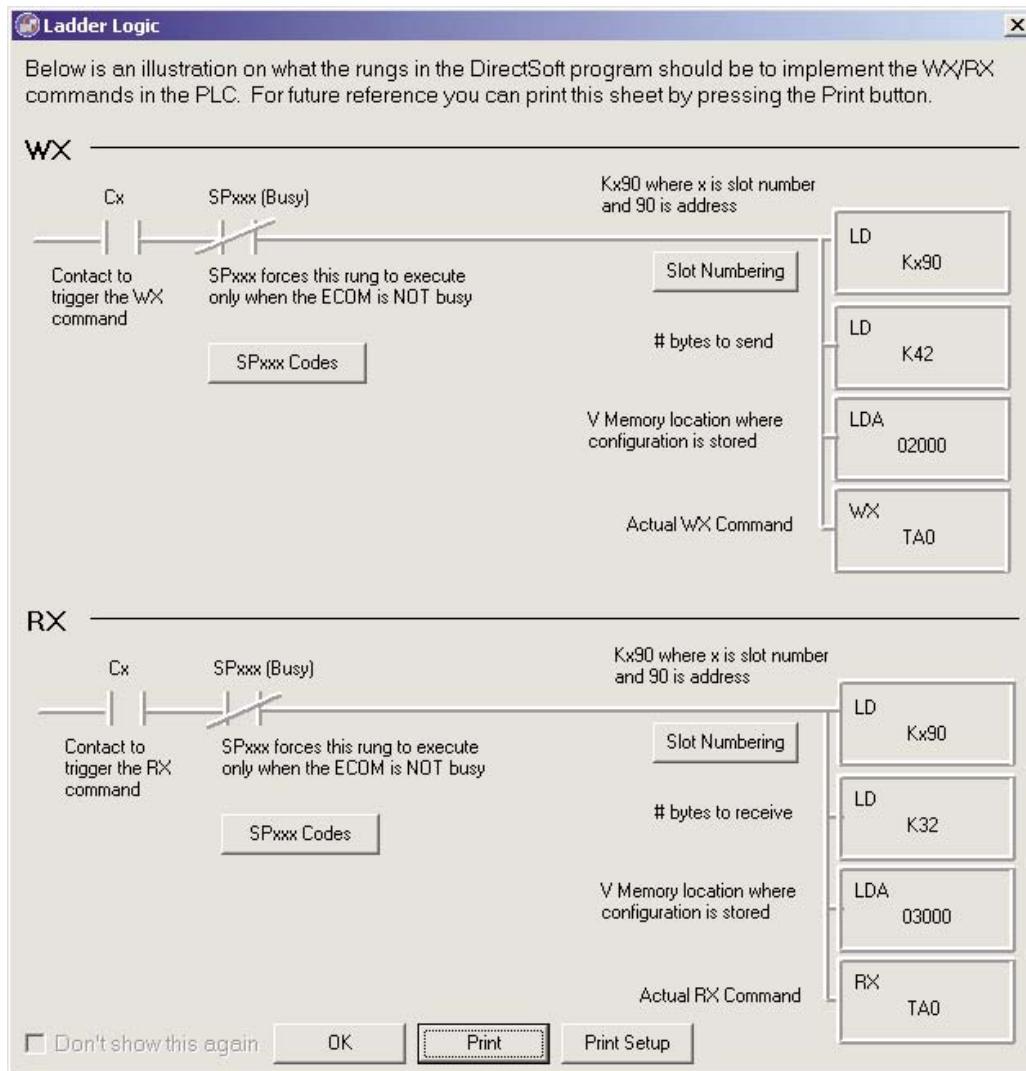
The Ladder Logic window will open (see next page).

On the next page is an example of the Ladder Logic window with WX and RX PLC Ladder Logic Networking instructions that are required for DataWorx to respond to the connected PLC.

This example represents the exact number of bytes needed to send/receive and the stored V memory chosen in the previous dialog of this configuration procedure.

The next page may be used as a guide for entering the PLC ladder logic.

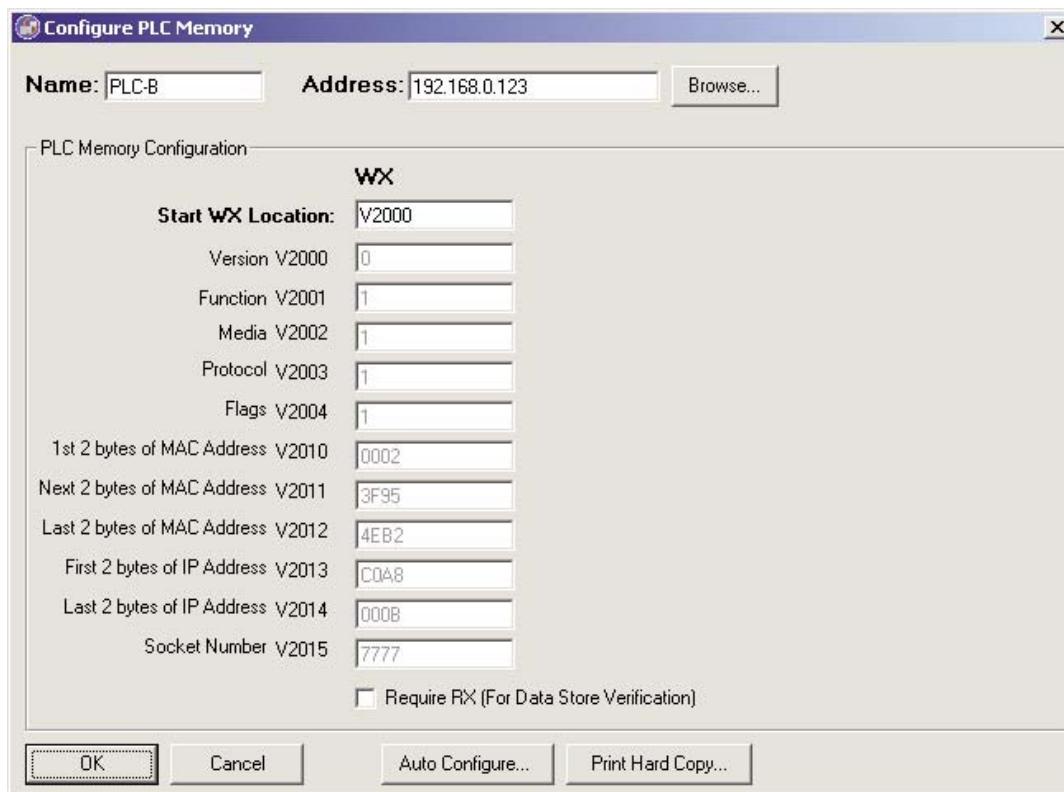
# DataWorx PLC



## PLC Memory

From the PLC Configuration window, click **CONFIGURE PLC MEMORY**.

The Configure PLC Memory window will open. Below is the configure PLC Memory window where the starting addresses for WX and RX instructions will be referenced.



By using the **AUTO CONFIGURE** button, all values shown in the window will be written to the registers shown.

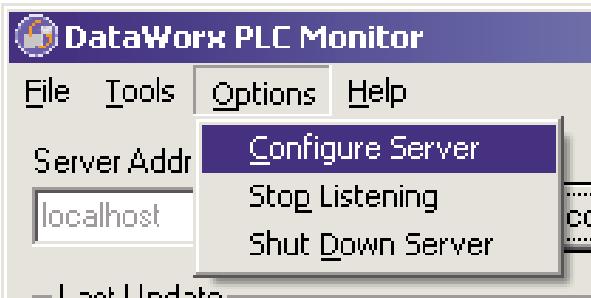


***\*\* IMPORTANT \*\**** Be sure that this memory range is set for "Retentive" in the PLC. Otherwise, these values will be reset during any power cycle.

### 6.2.4 Modifying a PLC

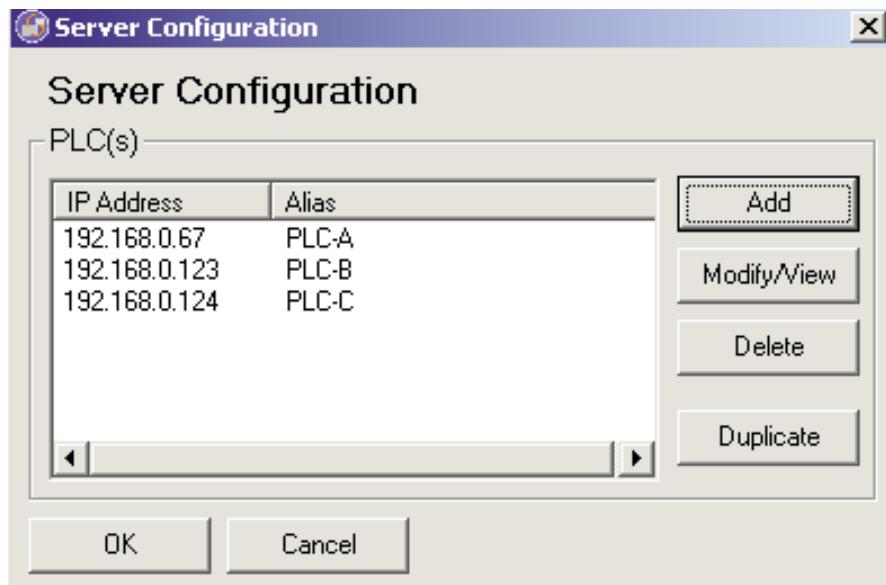
Go to menu:

OPTIONS -> CONFIGURE SERVER



The Server Configuration window will open. If no PLCs have been configured, then the PLCs list will be empty.

In the example below, three PLCs have already been configured for the Server.

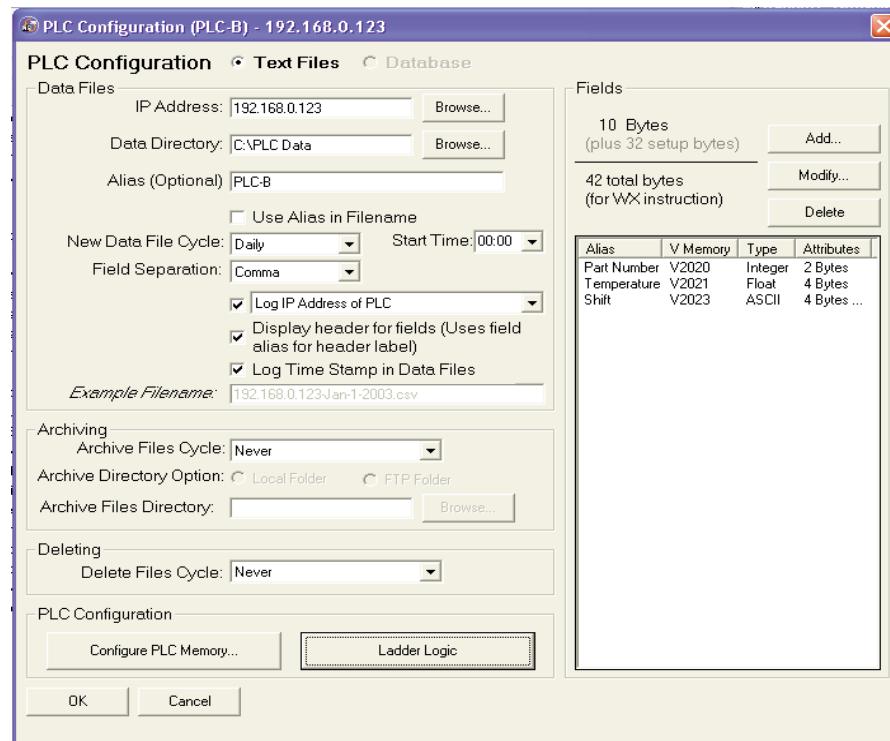


Select the PLC to modify or to view.

Click **MODIFY/VIEW**.

The PLC Configuration window will open and display the settings for the selected PLC.

Below is an example of the PLC Configuration window.



Note that the PLC Configuration window title bar displays both the PLC IP Address as well as the PLC Alias, if one exists.



*Note: From the main Monitor window, right click on the PLC and select Configure from the menu.*

Once changes have been made, click **OK** to save changes or click **CANCEL** to discard changes.

Once a PLC has been updated, the main Monitor window will show a status of “Pending” for the PLC while the connection between the Server and the PLC is being refreshed.

### 6.2.5 Deleting

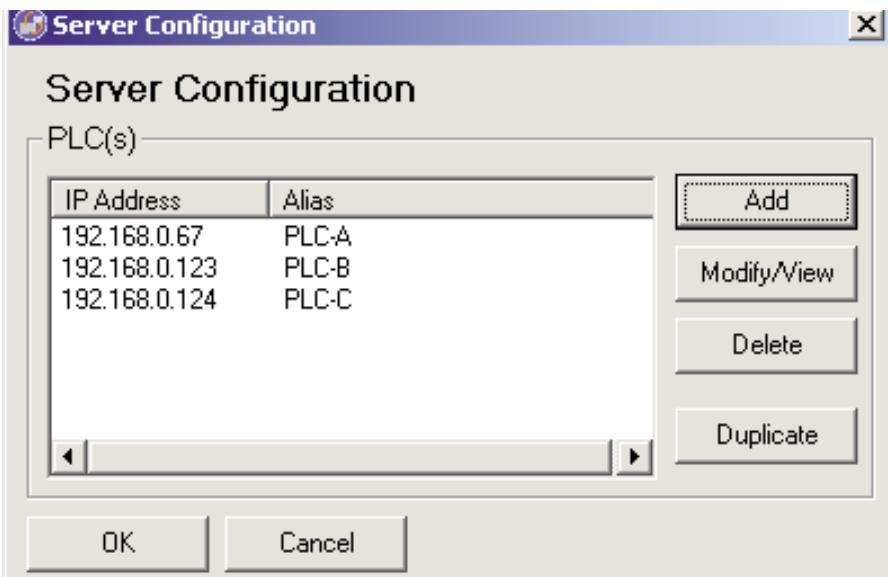
To delete a PLC, go to menu:

OPTIONS -> CONFIGURE SERVER



The Server Configuration window will open. If no PLCs have been configured, then the PLC list will be empty.

In the example below, three PLCs have already been configured for the Server.



Select the PLC to be deleted, and click **DELETE**. The PLC will disappear from the PLC list.

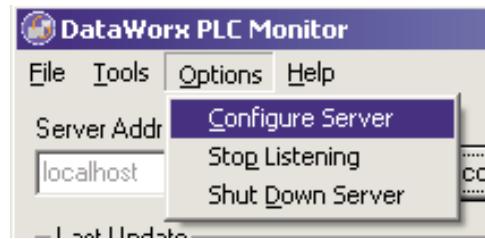
Click **OK** to close the Server Configuration window.

## 6.2.6 Duplicating

Duplicating is a great time-saving feature for users who are managing many PLCs with similar configurations.

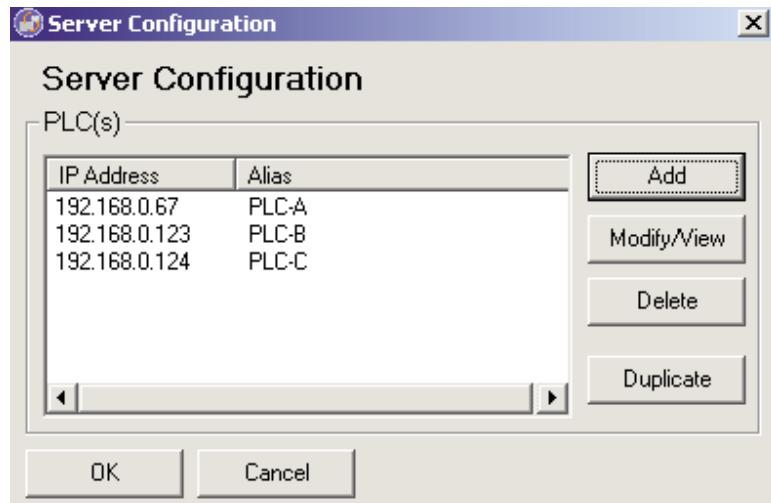
Go to menu:

OPTIONS ->  
CONFIGURE  
SERVER



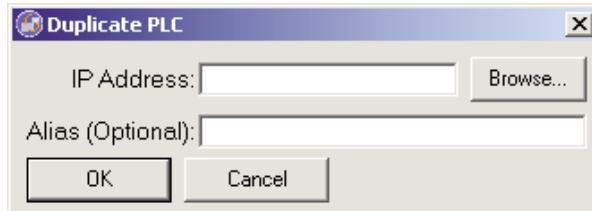
The Server Configuration window will open. If no PLCs have been configured, then the PLC list will be empty.

In the example below, three PLCs have already been configured for the Server.



Select the PLC to be duplicated, and click DUPLICATE.

The Duplicate PLC dialog box will open with prompts for the new PLC's IP Address and Alias.



Enter the necessary information.

Click **OK** to create the duplicate PLC with the specified IP Address and Alias. The Duplicate PLC dialog box will close and the new PLC will be listed in the Server Configuration window.

Click **CANCEL** to discard the duplicate PLC.

## 6.2.7 Listening

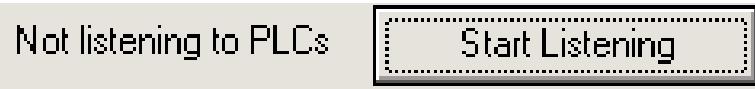
The DataWorx PLC Server maintains "Listening" and "Not listening" states for PLC input. The listening status may be changed from the Monitor as well as from the Server program.

Changing the listening state can be useful when in the process of installing new PLCs or changing the PLC configuration to prevent the Server from receiving irrelevant data.

The Server's listening state is displayed in the "Status" section of the Main Monitor window.

### Listening State

To begin receiving data, click **START LISTENING** from the Main Monitor window. Note: If the button label reads "Stop Listening," the Server is already in a Listening state.

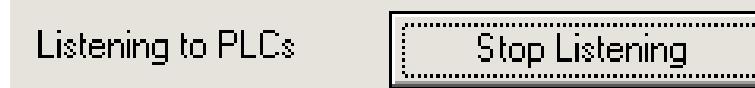


If successful, the option button will be labeled "Stop Listening" and the Server state will be "Listening to PLCs."

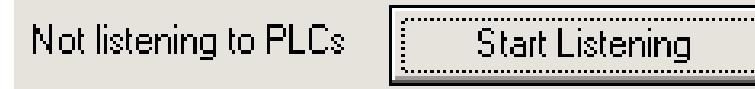


### Not Listening State

To make the Server stop listening, click **STOP LISTENING**.



If successful, the option button will be labeled "Start Listening" and the Server state will be "Not Listening to PLCs."



### 6.2.8 Backing up and Restoring

Backing up the Server configuration allows the user to later safely restore all Server settings in the event of a hardware failure.

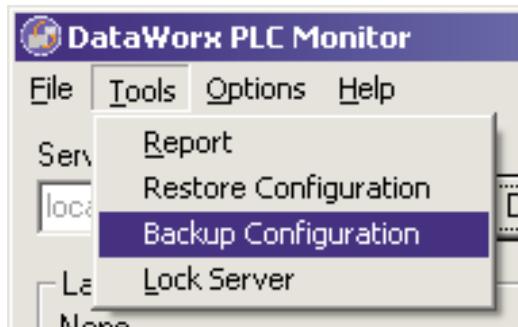
#### Backing up the Server Configuration

To backup a configuration, go to menu:

TOOLS ->

BACKUP

CONFIGURATION



A Save As window will prompt the user for a path and filename. Select the desired path and specify a filename. Note where the configuration file will be saved for future restorations, and click SAVE.

#### Restoring the Server Configuration

To restore a configuration, go to menu:

TOOLS -> RESTORE CONFIGURATION



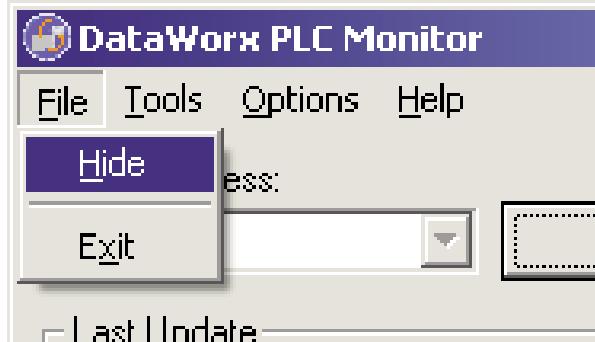
A standard Open window will prompt the user for a path and filename. Select the desired path and filename. Click OPEN, and the Server settings will be restored per the selected file.

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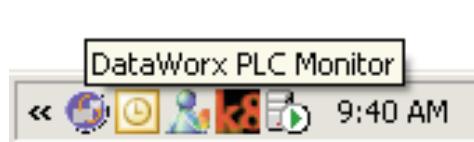
## 6.2.9 Hiding

Hiding is a convenient feature for temporarily placing the Monitor out of view for later access. Go to menu:

FILE -> HIDE



The DataWorx PLC icon will appear on the task bar.



The user can restore the application by right-clicking on the DataWorx PLC Monitor icon and selecting RESTORE.



### 6.2.10 Locking / Unlocking

Locking/Unlocking is a useful feature for preventing unwanted PLC configurations and Server listening state changes.

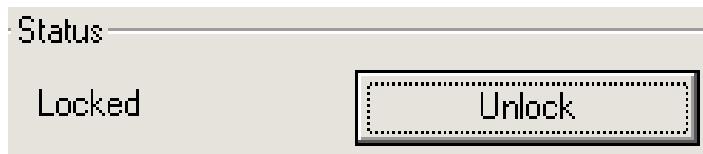
To lock the Server configuration, click **LOCK**.



The Lock Server dialog box will open, prompting the user for a lock Password.



Enter a lock Password, and click **OK**. If successful, the Status section will display a Locked status:



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**Warning: If the user loses the lock Password, the user will NOT be able to unlock the Server.**

---

To unlock the Server, click **UNLOCK**, enter the lock Password, and click **OK**. If successful, the Status section will display an Unlocked status.



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*Note: The Server can also be locked/unlocked from the toolbar by selecting: Tools -> Lock Server or Tools -> Unlock Server.*

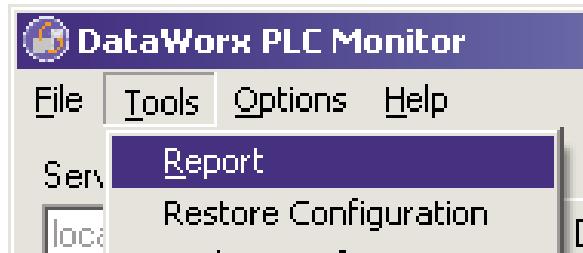
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## 6.2.11 Viewing Data Log Files

The ability to view the data log files is one of the most useful features of the Monitor. Users may view or save files generated by the Server over a network without having physical access to the Server.

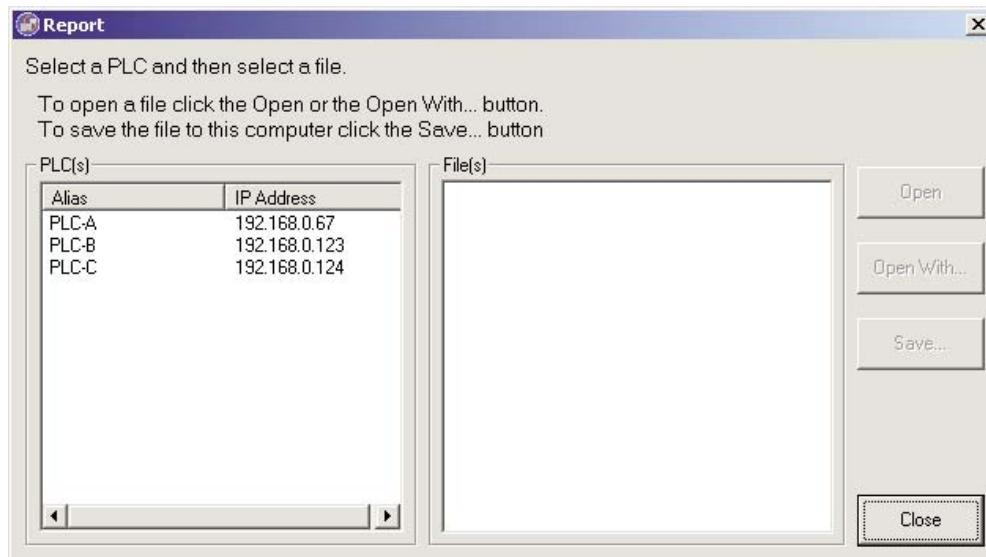
To view the report, go to menu:

TOOLS -> REPORT



The Report window will open. If no PLCs have been configured, then the PLC list will be empty.

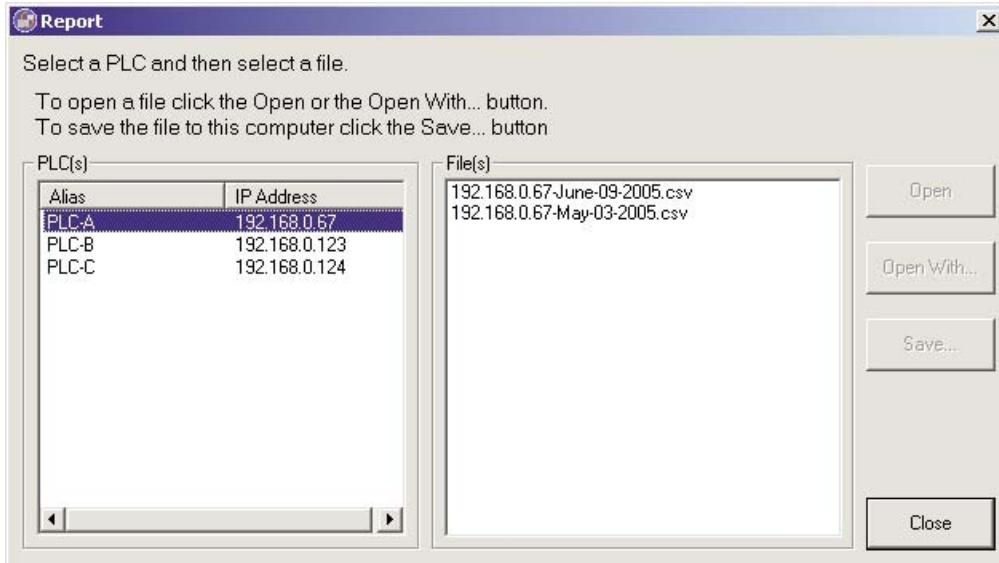
In the example below, three PLCs have already been configured for the Server.



## DataWorx PLC

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From the PLC(s) list, select the PLC to access its data for viewing.



Next, select a file from the File(s) list, and click either the **OPEN**, **OPEN WITH** or **SAVE** button.

Note the difference between these three options:

**OPEN** will use the default application to open the file.

**OPEN WITH** will prompt the user to choose the application in which to open the file, such as Notepad, Excel or another program.

**SAVE** allows the user to save a copy of any data log file to a location other than the Server. A standard Save window will open, prompting the user for a path and a filename. Once the location for the file has been determined, click **SAVE** to save the file, or click **CANCEL** to cancel. Either way, the original data file will remain in DataWorx for future access.



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***\*\* IMPORTANT \*\**** *If the user opens the current log file outside of DataWorx (Example: a log file opened from Microsoft Excel), the application will lock the file and not allow DataWorx to store data in the file. The DataWorx error log will record a "Permission Denied" error.*

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## 7.0 Troubleshooting

### **Cannot connect to Server**

- Double check the Server IP Address - it might not be correct.
- Verify that the Server and Monitor computers are online and can access network facilities such as e-mail and Internet.
  - Verify that the computers can access the Internet by going to a test web site such as [www.yahoo.com](http://www.yahoo.com).
- Ensure that all necessary cables are connected.

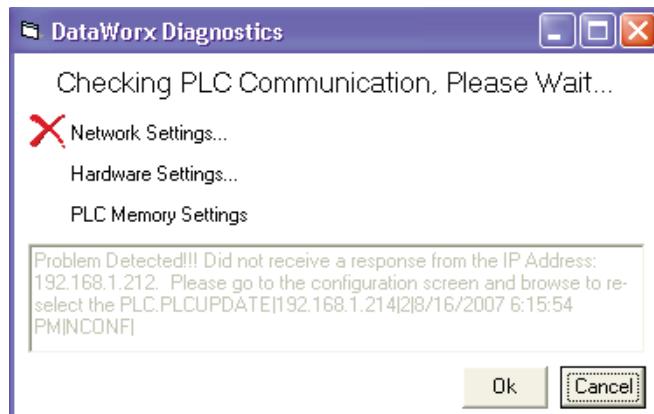
### **PLC is sending data, but DataWorx is not receiving updates**

- Verify that the Server is in "listening" mode.
  - Note the Status in the main Monitor window. The Status should display as "Listening to PLCs."
  - If the Server is not in listening mode, click START LISTENING.
- Verify that the PLC is configured to send data to the Server.
  - From the main Monitor window, go to menu:  
OPTIONS -> CONFIGURE SERVER
  - From the Server Configuration window select the PLC in question and click MODIFY/VIEW. The PLC Configuration window will open.
  - In the IP Address field, reselect the PLC by using the BROWSE button.
  - Click CONFIGURE PLC MEMORY.
  - In the Address field, reselect the PLC by using the BROWSE button.
  - Enter the WX start location if it is blank.
  - Click AUTO CONFIGURE or manually enter the values as displayed.
  - Click OK and confirm that no error messages display.

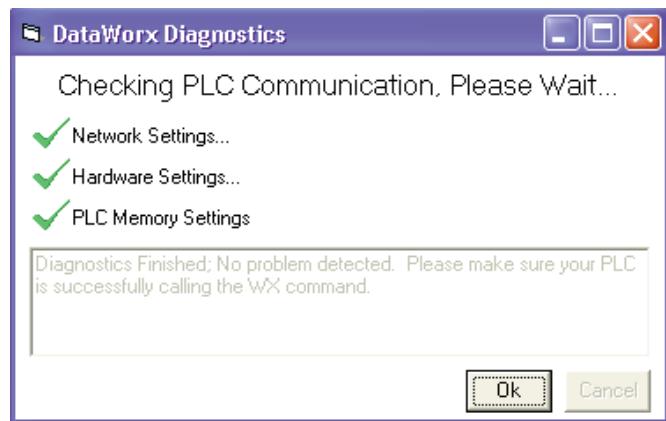
## DataWorx PLC

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- Use the PENDING DIAGNOSTICS button to check for reported failures.
  - From the main Monitor window, click PENDING DIAGNOSTICS.
  - The DataWorx Diagnostics window will open and launch a process to check relevant Network, Hardware and PLC Memory settings.
  - To stop the diagnostics at any time, click CANCEL. Otherwise, once the diagnostics are complete, click OK to close the DataWorx Diagnostics window.
  - If a problem is detected, a red mark will display next to the problem area, and more details will display in the DataWorx Diagnostics window, as shown in the example below.



- If no problems are detected, a green check mark will display next to each area, and a suggested next step will display in the DataWorx Diagnostics window, as shown in the example below.



## Server is running but not receiving PLC data

- Verify in the Server window that the Server is running, not paused.
  - If the Server Status is "Installed, Paused," click START/CONTINUE.
  - If the Server Status is "Installed, Running," verify that the PLC is correctly configured to send the data to the Server.

## Data files contain error messages stating incorrect format

- Verify that the PLC's configured fields match the Server's configuration.
  - From the main Monitor window, open the PLC Configuration window for the PLC in question and review the settings for each field.

## **Notes:**